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VOL. 1 No. 2

**AUGUST 1985**

# **JUST**

## **COMPUTERS**

with NEW ZEALAND PERSONAL COMPUTER

**AUSTRALIA'S LARGEST-CIRCULATION COMPUTER MAGAZINE**

*INCLUDING  
ARTICLES FROM*

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and  
POPULAR  
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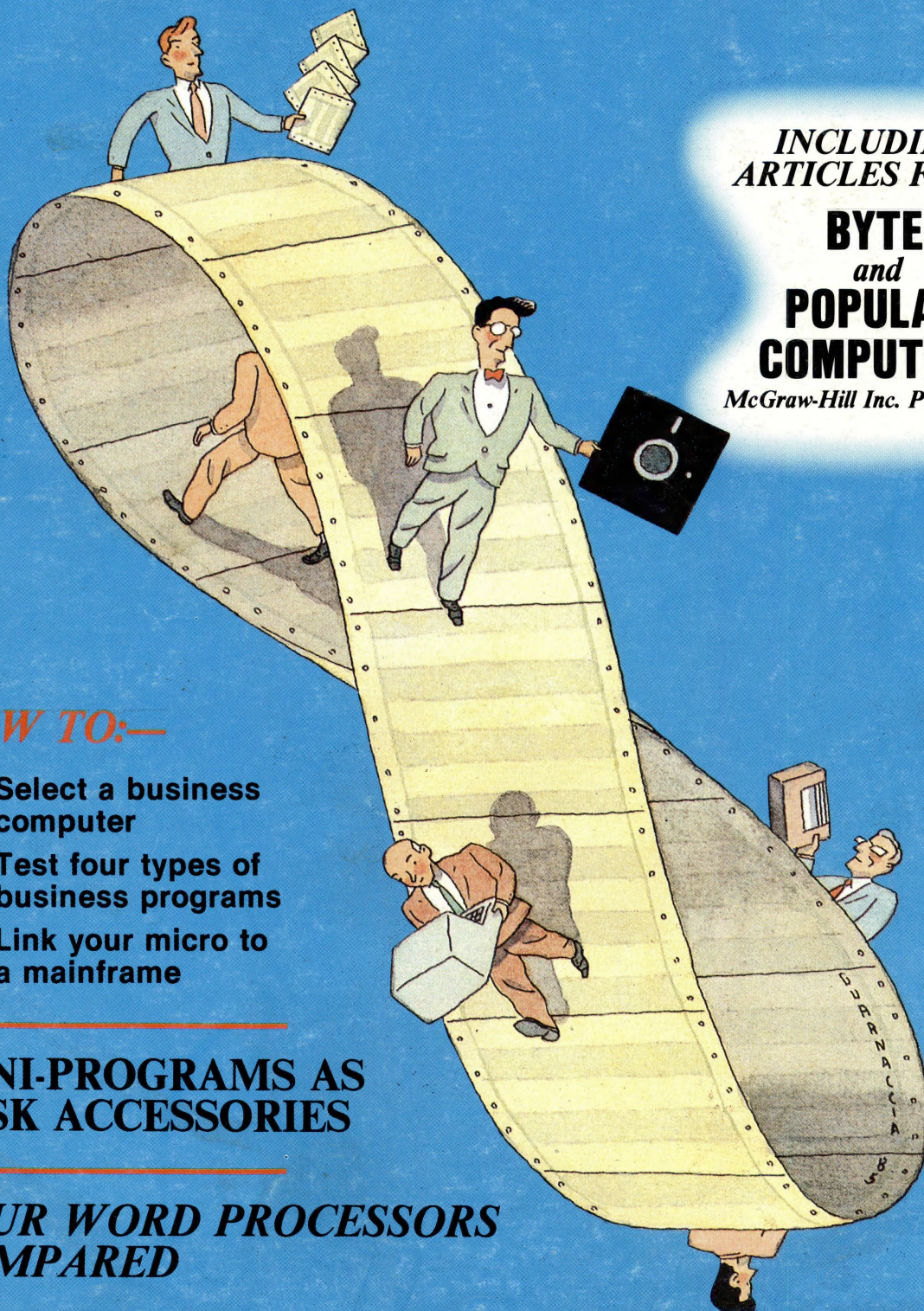
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### **HOW TO:—**

- Select a business computer
- Test four types of business programs
- Link your micro to a mainframe

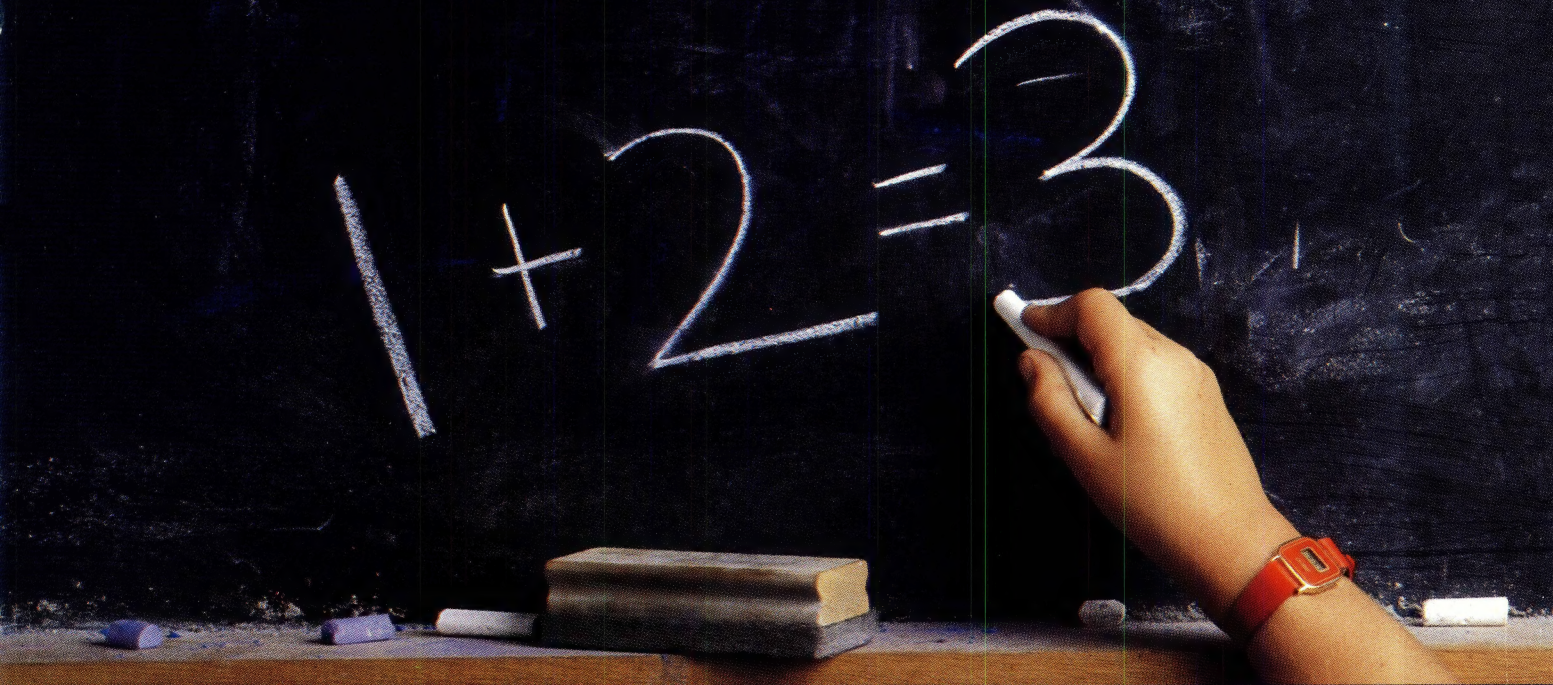
**MINI-PROGRAMS AS  
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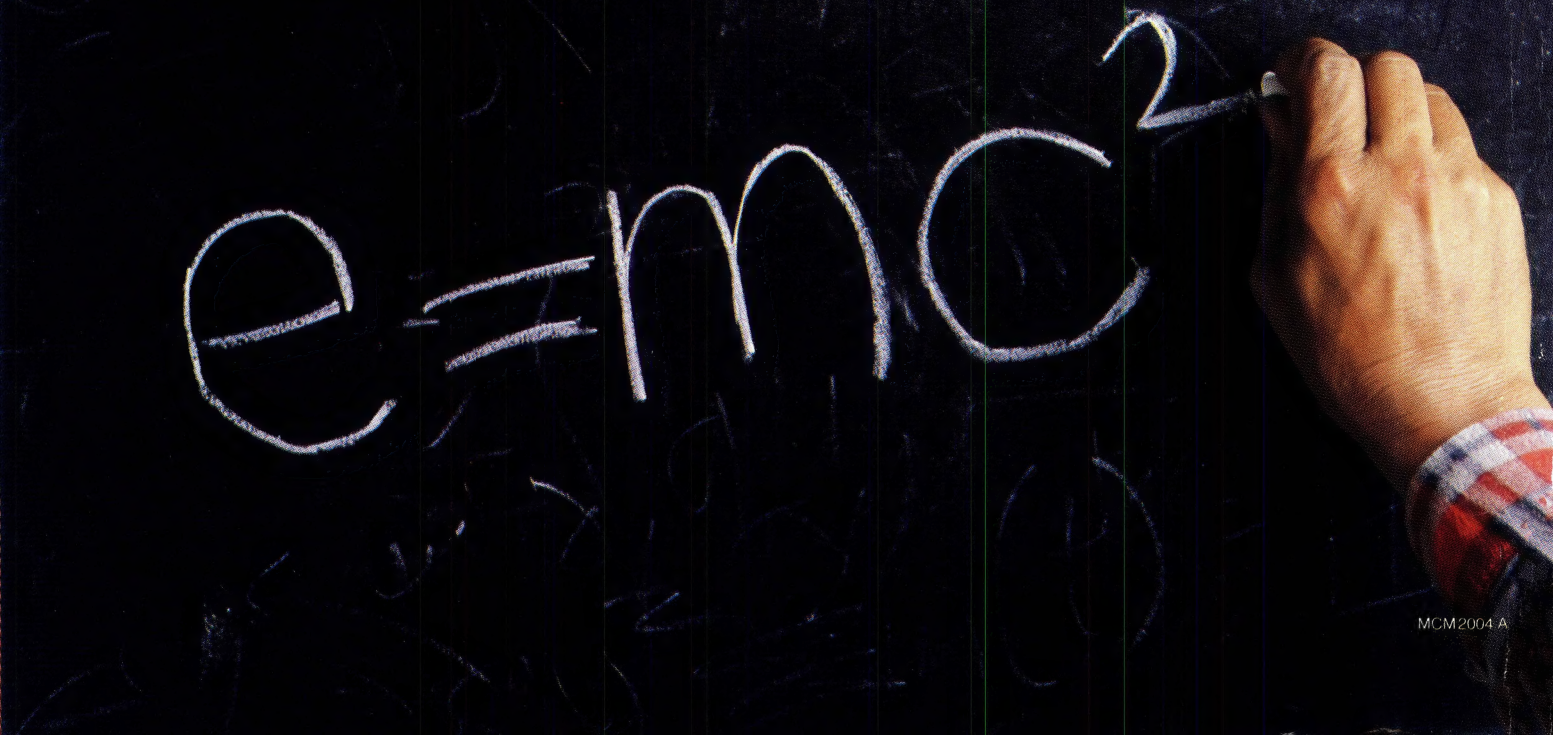




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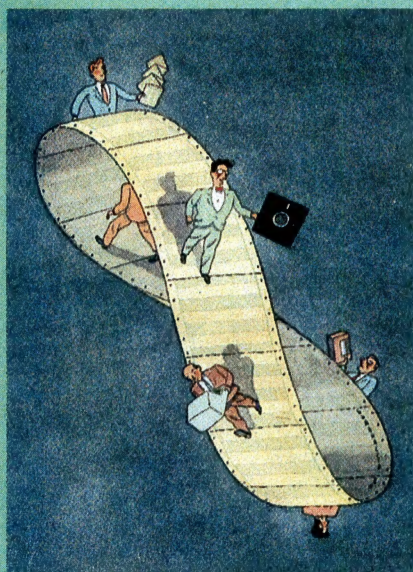
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JUST COMPUTERS  
with New Zealand Personal Computer

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M. BLAKE, V. BROEDERLOW, R. FORD,  
L. HANSEN, A. JOHNSON, A. McINNARNEY,  
B. RUBINI  
**PHOTOLITHOGRAPHY:**  
COLOURART STUDIOS  
**PRINTING:**  
WEBPRINT DIVISION OF WILSON & HORTON LTD.  
**DISTRIBUTION:**  
GORDON & GOTCH AUSTRALIA,  
GORDON & GOTCH NEW ZEALAND.

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# August '85

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**TECHNOLOGY**
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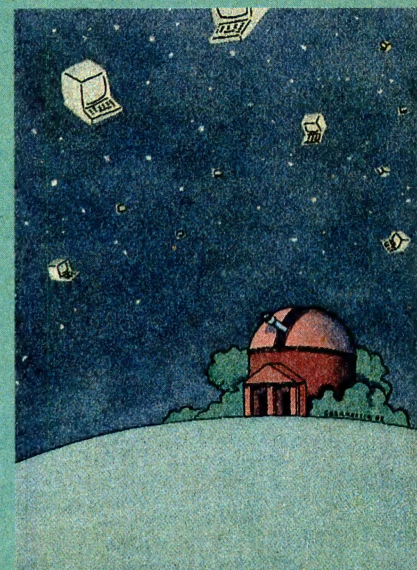
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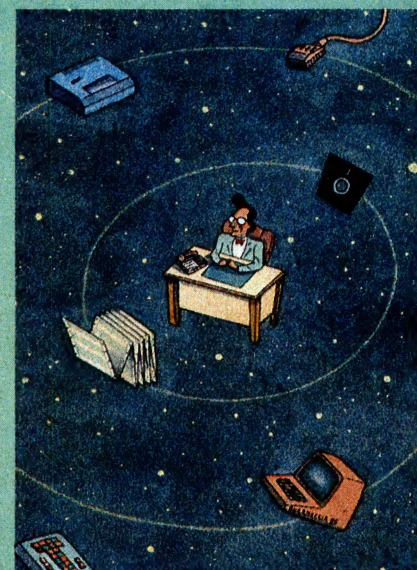
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## IT'S THE BEST WAY TO CHOOSE BETWEEN SEEMINGLY SUITABLE BUSINESS PROGRAMS

BY TAN A. SUMMERS

**B**UYING THE WRONG SOFTWARE carries a heavy price: wasted money, wasted time, and aggravation—not to mention the embarrassment of admitting that you bought a dud or a program that doesn't fit your specific needs or work habits.

Of course, the best way to avoid buying software that completely misses the mark is to follow the conventional rules: analyze your needs, talk to colleagues and friends about the software they use, and read the reviews. Software reviews tell you for whom the program is intended, what its capabilities are, how well it works, and whether you should consider buying it. They also tell you how to contact the manufacturer should you require additional information regarding any special requirements you expect a program to accommodate.

But sometimes talking to others and reading reviews aren't enough. Say you've narrowed your choices to two or three programs that, by all accounts, have the basic features you

need. How do you decide which one suits you best? The only way is to test-drive it yourself. Get into the program and see how it feels. Check its acceleration, its handling in the curves, its braking in emergencies. Just as you wouldn't buy a new car until you took it for a test drive, you shouldn't buy a program without taking its disk for a spin.

While you usually can't expect to borrow a software package from a computer store for a week's worth of exhaustive testing, you can put a program through some simple tests as you shop. The procedures presented here will help you test four types of full-featured business applications software: word-processing, spreadsheet, file-management, and graphics programs.

TITLE DESIGN BY DAN PELAVIN



# WORD-PROCESSING PROGRAMS

**1** *Typing Speed:* Begin by entering a paragraph or so of text as fast as you can type. If you're not a fast typist, type nonsense words interspersed with spaces. Letters should appear on the screen as fast as you type them. When you reach the right margin, words should wrap around to the next line without lagging behind your typing. If you can get ahead of a word processor during normal text entry, it's not adequate.

**2** *Copying Text:* Duplicate the block of text you've typed. Find the appropriate commands and place the cursor at the top of the text, mark it, move the cursor to the bottom of the text and place another mark, then copy the block. Note how easy or difficult the process is and repeat it several times until you have plenty of text to work with, say, two or three pages worth. Also make sure the program doesn't balk at copying a page or two at a time or at moving a block that straddles a page break.

**3** *Cursor Control:* Test how easy it is to move around within the document using the cursor control keys or a mouse. Scroll up and down through the text, one screen or page at a time. There should be a single command to move the cursor to the top or bottom of the file. The program should jump from top to bottom of a two-page file quickly without scrolling the entire file across the screen.

**4** *Text Editing:* Try editing the text you've entered. The commands for doing so should be flexible and convenient. Notice whether you can stay in the same mode for writing and editing. A program that requires you to constantly switch modes can be annoying.

**5** *Text Formatting:* Try changing the margins and double- or triple-spacing the text. Use different formats: justified right and left, ragged left, centered. These procedures should not be complicated.

**6** *Automatic Reformatting:* See if the program automatically reformats paragraphs whenever you delete a few words or set new margins. Doing it manually can be a laborious process. At the same time, make sure that different paragraphs in your sample text can have different margin settings.

**7** *Margin Settings:* See how far the right margin can go. If it goes off the screen, the program should be able to scroll sideways so that you can view all of the text.

**8** *Search and Replace:* Return to the top of your text and try the search-and-replace command: replace all occurrences of the word "the" with asterisks, for example. Does replacing "the" also affect "there"? You should have the option to replace whole words or parts of words. Experiment with search options, including global search, in which the program should automatically move to the next occurrence of the word without requiring a second command.

**9** *Type Styles:* Try marking the text for boldface, italic, or underlined. It should be simple. Make sure the program can handle sub- or superscripts if you need those capabilities.

**10** *Printer Compatibility:* Make sure that the program has a built-in driver for your brand of printer and that it can take advantage of all your printer's features.

**11** *Saving Text:* Does the program automatically save text files before you quit or prompt you to do it? The program should remind you to save the file but give you the option of exiting without saving. If it doesn't do both, you will more than likely have accidents when using the program.

**12** *Data Format:* Try creating an ASCII file. The procedure should be simple if you plan to transmit files or use documents on more than one computer.

Designed to give you a rough idea of a program's operation, these procedures are not all that time-consuming. You can easily run through the tests for each type of program in an hour or less while you're in a computer store.

## Where to Test

Find a computer store that specializes in software or at least has a good selection of programs. Don't waste time with a store that sells primarily hardware and stocks only demos of the current best-selling software.

It's a good idea to pick a store you like and stick with it. Although dealers are willing to let customers try whatever software is on hand, most are reluctant to open expensive new software packages, especially for one-time browsers. Dealers are

more likely to give preferred treatment to regular customers. Also, when the software is too complex for a thorough in-store review, dealers are sometimes willing to let regular customers take the manual for a few days to get a better feel for the program's personality or even take the software to the office for more thorough testing.

In any case, make an appointment before coming in to review the software. That way you can reserve a period during a quiet time of day, and a salesperson can be better prepared to get you started and answer your questions. Make sure ahead of time that the store can provide hardware similar to yours. If you have a hard disk, you'll want to try out programs on a system with a hard disk.

Finally, be ethical when dealing with the computer store and you'll get better service in the long run. Don't test software at one store and then buy at another to save a few

dollars, and don't expect to test half a dozen packages at one sitting. Remember, however, that you're not obliged to buy a package that doesn't meet your expectations simply because you were able to see a demonstration or try out a program yourself.

## Getting Started

We'll assume that you've done your homework and have narrowed the field to two or three programs. Here are some general tips that apply to testing any type of application program.

First, in preparation for the in-store tests, arm yourself with some actual data—financial figures, names and addresses, business letters, whatever applies to the type of program you'll be testing—that you can enter into programs. It's easier to enter real data in a hurry than it is to fabricate it.

When you sit down to test a program, try to get an overall feel for

Tan A. Summers frequently reviews software for *Popular Computing* and is the author of *The Small Business Guidebook to PC Compatibles*, to be published by Scott, Foresman later this year.



# SPREADSHEET PROGRAMS

**1 Spreadsheet Setup:** Construct a small worksheet with titles, numeric data, and formulas to see how easy it is to enter data. Your sample might look something like the figure; cells B8, C8, and D8 contain a simple formula to subtract row 6 from row 5. See if you can enter formulas by moving the cursor to the desired cell as well as by entering the cell address.

	A	B	C	D
1 (MicroCalc)				
2				
3 Year:		1984	1985	1986
4				
5 Sales:		45000.00	50000.00	60000.00
6 Costs:		30000.00	35000.00	40000.00
7				
8 Income:		15000.00	15000.00	20000.00

**2 Editing Cells:** Move to a cell with a formula in it and change the formula. Start a command, then change your mind and "back out." Both editing and original entry procedures should be simple to use.

**3 On-Screen Help:** As you work, invoke a help screen from time to time to evaluate whether it relates to your position in the program and helps you with potential problems.

**4 Cursor Movement:** Move the cursor as far as it will go to the bottom and right, then come back. This shows you how quickly you can move around the worksheet. The program should let you scroll easily in all four directions and have a "home" command that quickly returns you to the top left of the model or to a location you specify.

**5 Standard Features:** As you walk through each menu to see what's available, try some of the features. Insert, delete, and copy rows, columns, and a range of cells.

**6 Cell Formatting:** Format a row, a column, and a group of cells. Find out how wide a column can be and whether each column's width is independent of others. The program should give you plenty of formatting choices, such as centered versus left- or right-justified data, and various numeric formats including dollars and scientific notation.

**7 Windowing:** If the program uses windows, open the maximum number available and try scrolling within each one. You should be able to move the cursor around within each window independently.

**8 Graphics:** If the program has graphics capabilities, create a graph, using data from your sample spreadsheet. Print the chart. Are you satisfied with the appearance of the finished product? If not, you'll need to purchase a separate graphics package to enhance the output.

**9 Printing Features:** Try printing your worksheet. It's helpful if the program can print negative numbers in parentheses. Check to see if the program can instruct the printer to use compressed mode in order to get more columns onto one sheet of paper. See if the program automatically divides the output into pages and if you can also define manually where the page breaks will fall. Can the program print just what you see on the screen for those instances where you need to print only a portion of the sheet?

**10 Calculation Speed:** To test the program's overall calculation speed, it's best to use a large sample file with interrelated, complex formulas. If you don't have a large file on hand to recalculate, ask the dealer for a sample file. To test, turn off the program's automatic calculation mode, change a key figure near the top of the sheet, then issue the recalculate command to see how long the program takes to recalculate the figures.

**11 Special Options:** Check the documentation for less easily tested features. For example, the list of preprogrammed functions should include mathematical formulas that you can use to sum and average ranges of cells, work with dates, accurately round numbers, and perform other tasks difficult to program into worksheet cells. See if you can link models and if the program creates DIF (data interchange format) files that let it exchange information with other programs.

it. If the program has menus, browse through them all to see what the choices are and how easy they are to understand. If the program is command-driven, try out several commands to see if they make sense and are easy to learn and uncomplicated to use.

As you begin entering data and working with the program, check out its basic operation. Notice whether prompts, help screens, and error messages are consistent and easy to understand. See if the program takes advantage of your computer's function keys and if you can reprogram them yourself. Try undoing commands to see if editing and error recovery are easy.

If you plan to use the application program with desk management or other concurrent software, test them together to see if the program's operation is affected.

Look at the accompanying documentation. It should have a thorough index, a complete technical reference and command summary, and a tutorial either as part of the manual or on disk. Watch out for poorly written, overly technical manuals. Sometimes the products they describe are designed for programmers rather than general business users with an intermediate level of expertise.

Alas, not all types of programs lend themselves to quick tests. Most integrated programs, for example, are too complex to test thoroughly while you're in a store. If you are not permitted to borrow the software, you can at least check how smoothly you can move from one application to another and see how easily you can share information between them. You also can put each portion of the program through the more

basic of the tests discussed here.

Communications software is also tough to test. Sometimes you can't even look at menus in a communications program without having a modem connected and on-line. And don't attempt to test accounting software at a store. You need to be able to set up trial accounts, enter realistic data, and try out the package's reports before you can begin to get to know accounting software on a personal basis.

But for the four major types of applications packages, the step-by-step procedures outlined in the accompanying text boxes should help you with the subjective part of your decision-making process. As you put each program through its paces, follow your instincts. No program was designed to suit everybody's work habits. Only you will know which one feels right to you.



# FILE-MANAGEMENT PROGRAMS

**1** *Creating Forms:* Set up a simple name and address file to see how you define fields as text, numeric, date, formula, and so on. Are you comfortable creating the forms or does the procedure seem awkward? Does the program prompt you for the next step? Too much prompting may slow down the program's operation; too little may leave you spending more time with the manual than with your data-management needs.

**2** *Data Entry:* Enter several names and addresses. The program should automatically move the cursor to the next field. You should also be able to move backward to correct mistakes.

**3** *Locating Data:* Once you've entered some data, try casually searching through it for a particular record. If the program requires that you designate certain fields as search keys while you're creating the form, it should allow as many keys as you'll need. Sometimes, for instance, you might want to search by an individual's name; other times, you may need to search by a company name. Try to browse through the files as you would through a card file.

**4** *Editing Files:* Save the file, then open it again and delete and add some records. This happens so much in the course of a day's work that the procedure should be as simple as possible.

**5** *Editing Forms:* Try editing the form itself after you've entered some data. You should be able to add new fields without disturbing data you've already entered. The software should protect you against accidental deletion either of data fields or of data itself by asking you to confirm a delete command.

**6** *Error Handling:* Try to exit the program without saving. Does the program catch your mistake and remind you to save? If not, chances are that you'll lose data with this program at one time or another.

**7** *Sorting Functions:* Try a simple sort and send the report to the screen, a printer, and a disk. The program should let you determine which field within a record will be the index key when sorting. You should be able to determine several sorting levels for the report so that if three employees are named Smith, for instance, the program will list the three alphabetically by first name as well.

**8** *Search Functions:* Try out the search function including logical searches, which let you request that a report consist of this record AND that record, or all records NOT in a certain category. Also try partial searches, in which the program will look for a word or phrase within any field, so you can find customer John Friedman's record even if you can't remember whether his name is Friedman, Fried, or Friedenstein.

**9** *Search and Sort Speed:* Find out if the dealer has a large sample file you can use to test how fast a program searches and sorts during the report procedure. If no large file is available, a short file will suffice: if you get bored waiting for the program to search and sort a short file, you can assume that the program is too slow for you.

**10** *Printing Functions:* Design a simple tabular report and print it. This exercise will let you see how the reports will actually look, since the on-screen versions are usually quite different from printouts of the same report.

**11** *Report Formats:* Check the documentation for a complete list of available report formats. Can the program produce the types of reports you need? Are the reports limited only to lists of the data you've entered? Can the program provide calculated fields? Find out how wide reports can be and whether the software supports special print modes such as condensed characters. If the report formats seem too limited, ask if a separate reporting module is available.

# GRAPHICS PROGRAMS

**1** *Creating Graphs:* Start right in by creating a graph to see whether the software uses menus or direct commands. Menus are preferable if you use the software infrequently enough that you're likely to forget program commands between sessions. Unless menus are well done, though, they'll slow you down if you use the program frequently.

**2** *Input Methods:* You should be able to produce correctly proportioned graphs just by entering the numbers to be compared. If the program requires an input device other than the keyboard, you shouldn't have to switch constantly between an alternate device and the keyboard.

**3** *Editing Graphs:* Try changing the information displayed in the graph. Is editing or updating easy? Does the graph automatically reform, or must you instruct the program to recalculate the graph each time?

**4** *Types of Graphs:* Try producing several kinds of graphs—such as bar, line, and pie charts—to evaluate the variety and speed with which they can be created. See if you can superimpose one graph on another or display several charts on the screen at one time.

**5** *Label Types:* Be sure to try out different labels to see what font styles are available. You should have several sizes and styles on hand for variety and for differentiating between titles and other labels. Notice whether the program

helps format the graph by keeping titles centered.

**6** *Freehand Art:* If the program offers freehand and enhancing modes, try sprucing up a graph or creating a logo or illustration to see how useful these features are. Also ask yourself whether the final result is presentation quality. Consider whether you'll be printing charts or displaying them on the screen or as slides photographed from the screen.

**7** *Printing and Plotting:* If you need hard copy, make sure the program supports the printer or plotter you'll be using. Get an output of a sample chart on a printer or plotter similar to yours. Does the program let you specify the colors that will be used either on-screen or as sent to the printer or plotter? If not, are the colors the program uses attractive?

**8** *Slide Shows:* Find out if the program provides a "slide show" option for displaying finished graphs during a presentation. If so, try the demonstration program usually included on the disk.

**9** *Transferring Graphs:* You'll probably need to turn to the documentation to ascertain the program's ability to create a graph from imported information. The program should accept DIF files or operate on files made by other programs you own or plan to buy. See if finished graphs can be transmitted by telephone and reconstructed by the recipient. □



# Consulting the Oracle

**W**e tend to treat computers like oracles. This isn't necessarily bad. In ancient times both statesmen and business executives consulted oracles. There were a lot of them to choose among, from the gang down at the local laurel grove to the much better known outfits in the capital city. Everyone knew, though, for the real goods you had to go to the cave at Delphi and consult the Pythoness, otherwise known as the Priestess of Apollo.

Of course, you couldn't just waltz into the cave and ask. A politico hoping to find out about an upcoming alliance or a businessman looking for advice on a trading venture still had to follow the standard procedure. That included walking slowly up the (steep!) Sacred Way performing rituals like hand washing at each station; and of course all were expected to bring gifts.

Eventually the supplicant would make it to the entrance, be led down into the cave, and get to see the Pythoness. For most of the shrine's existence this was a nervous young woman. She would listen to the question, get a good whiff of the sacred vapors coming out of the earth, and babble something. Usually the customer wouldn't understand a word she said, but there was always a squad of priests to interpret.

That's how the consulting business worked in those times. Today if we remember anything about the Delphic oracle at all, it's likely to be how

*If you ask the right questions,  
you can get good advice from  
your computer*



ambiguous the prophecies were. For example, Croesus, the richest man in the world, paid a small fortune to have the Pythoness tell him what would happen if he invaded Persia. "You will destroy a great kingdom," the priestess babbled. He invaded, and when the smoke cleared he discovered he certainly had destroyed a great kingdom, his own.

That sort of thing couldn't have happened too often, else how could Delphi have been the Arthur D. Little of ancient times? After all, we may know more facts than our ancient Greek ancestors, but we're not really smarter than they were, and smart people won't pay for riddles when they need specific advice. The Delphi company must have done

something right pretty often, or they couldn't have stayed in the consulting business.

In fact, the oracle usually did give good advice. Questions asked at the shrine generally fell into three broad categories: religious-moral, political, and commercial. They could handle them all.

The staff at Delphi were the best theologians around and never had trouble with religious and moral questions. Commercial questions weren't much harder. Delphi was central headquarters for the best intelligence network of ancient times. The firm had acolytes and junior priests in every country and most cities. In addition, each traveler to Delphi was routinely questioned on conditions not only back home but also in every country and city he'd come through on the way.

Delphi also collected information on what happened to their customers. After a while they had good records: good enough to draw maps from. The maps were primitive, but they were a *lot* better than nothing. The records also gave the usual travel time from one place to another and when the stormy season began. It was no wonder, then, that a commercial trader asking if he should ship wine to Libya or tin to Smyrna was likely to get good advice. Mediterranean weather is reasonably predictable from spring into fall, and the merchant would have

Science fiction writer Jerry Pournelle, who joined the micro revolution eight years ago, is a contributing editor of *Popular Computing*.



ning. It's nearly impossible to get an MBA without using a spreadsheet. Everyone else has them, too.

The result is that companies consisting of, say, recent college graduate Artemesia Huddle, her little brother, and her college dropout fiancé can generate business plans and other financial documents that look more impressive than anything AT&T could have given you ten years ago.

Of course Ms. Huddle's sales projections are actually based on conversations her boyfriend overheard at a truck stop, and she got her overall economic forecast from an Ouija board, but that's all carefully buried in beautiful curves, graphs, and tables. I mean, how could a program with a name like Lotus lie to you?

But things are worse than that because the modern hard-nosed bottom-line MBA philosophy is fundamentally flawed. Let me give an example.

The aliens have arrived. They're friendly, but they want the Earth. However, they're in no hurry to collect. Here's their offer: every human on Earth will receive an income equivalent to \$1 million a year. Robot factories will be installed to produce plenty of wonderful things you can buy with that money. Furthermore, all diseases will be cured and everyone will be guaranteed a life span of one thousand years.

There's one catch. After two thousand years, every human will be born sterile.

Assuming we believe the aliens can keep their promises, should we accept?

Every MBA I ever asked said no; but every MBA decision theory I ever heard of says we should.

Rule of thumb: if you don't know of an expert whose advice you would follow, the question is certainly not one to ask a computer.

### Helpful Little Beasts

This isn't to say that computers can't be useful and even vital. Computers don't understand the world and can't help us in situations where no one has any expertise: but where such expertise exists, computers often can apply it better than humans.

Case in point. Computers are excellent for accumulating data and plotting past history. Unlike people, they have excellent memories. They're very good at going through complex data and finding the exceptional cases.

Most stock market analysts say that the successful stock traders (as opposed to brokers, who make

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**C**OMPUTERIZED  
databases can serve  
modern executives in  
the same way the  
Delphic oracle served  
merchants in classical  
times, but with  
much better results.

---

money on commissions whether their clients get rich or go broke) study the individual stocks they buy. They know something about the companies they're investing money in; some reason why this or that company is undervalued. Sometimes that's specialized knowledge, analogous to the priests at Delphi hearing that Smyrna had lots of money but their regular grain shipment was sunk in a freak storm. Sometimes, though, the information is right out there for everyone to see but buried in a tangle of irrelevant numbers.

That's one use for computers, then: examining masses of data to find the interesting anomalies.

Computers are good at applying rules. People forget things. We especially forget exceptions. If you come up with a decision something like "sell if it goes over 37.25 unless Consolidated Dust has gone below 15.66, in which case offer no more than 44.50 for Amalgamated Mess unless oil had dropped below 26 dollars a barrel, in which case offer up to 51.25 but sell all my stock in Rigid Jawbone except for 100 shares because I want to go to the annual meeting, and don't sell Jawbone be-

fore March 17 because of the tax situation," a computer is *far* more likely to get it right than you are. Moreover, given present tax regulations such complex decision functions aren't so unusual, either.

A computerized database can serve a modern executive in the same way that the Delphi priesthood served merchants in classical times, but much better, because the computer doesn't forget anything. The information can not only be accumulated, but also organized to show trends. Computers can't make predictions until some human devises a theory—but the machine can often be useful in generating that theory. Just as some geographic features, such as really big meteor craters, are not visible from the ground and can be seen only from an airplane, some trends can't be spotted until vast quantities of data are lumped together in ways no one would ever have tried without computers.

Expert systems can be extremely useful. They work particularly well in bureaucratic settings, where the exact decision isn't too important, but getting things decided quickly is. Some companies have installed expert system programs to examine expense reports, applications for vacation, and other administrative matters. Mashing this data by hand is tedious at best, and doing it without mistakes is nearly impossible. Small computers *like* doing moving averages.

### The Quest Goes On

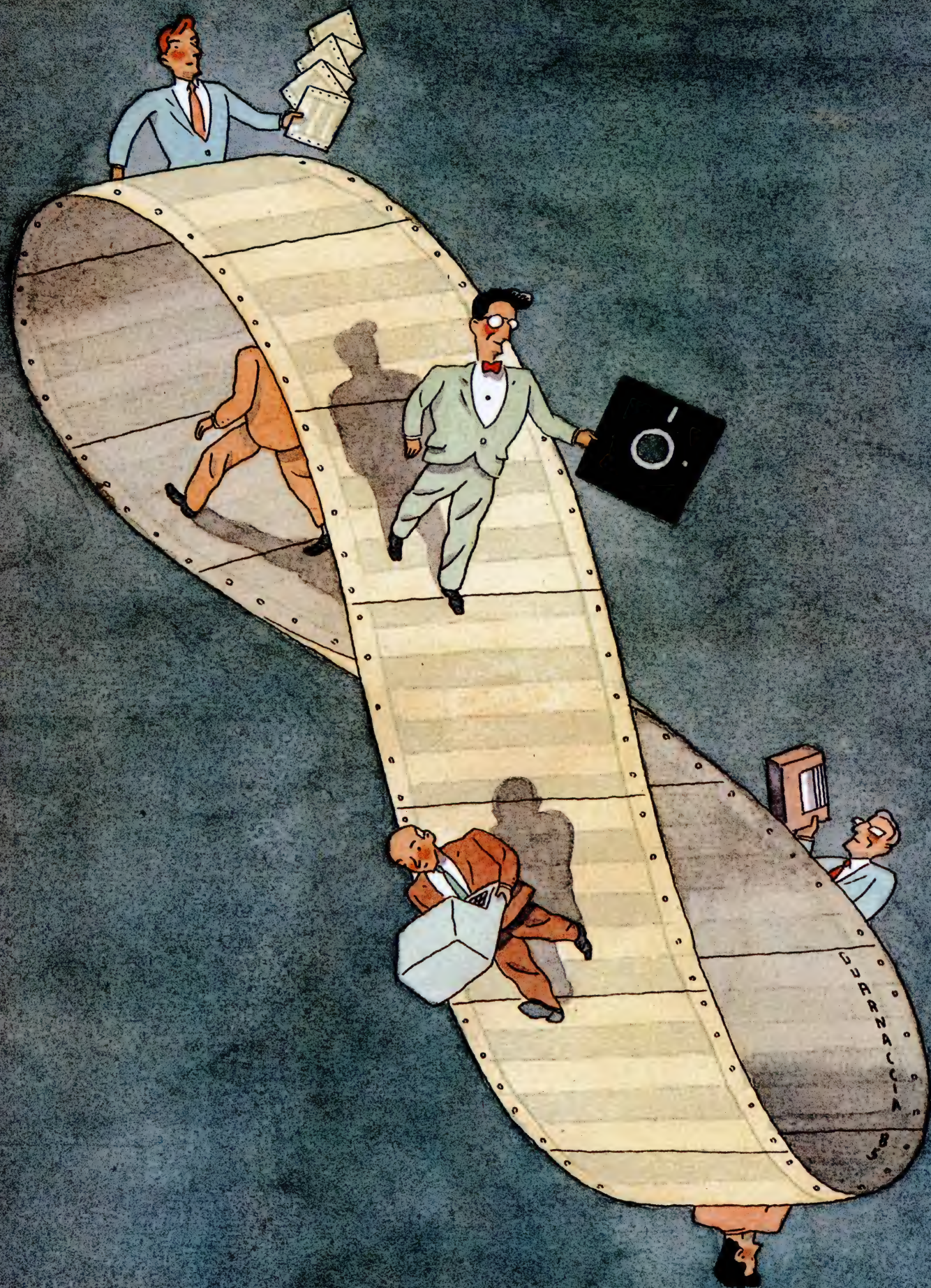
The Pythoness at Delphi was in some ways more useful than a computer. If you went to Delphi for information, you were likely to get the best available. If you wanted moral advice, you'd do better than you will asking a computer today.

Otherwise, things aren't very different. Those who consult the right kind of oracles generally have a strong edge over those who don't—but asking the wrong questions has always been a good formula for disaster. □

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Jerry Pournelle welcomes comments from members of the micro revolution. Write to him c/o *Popular Computing*, POB 397, Hancock, NH 03449. Jerry tries to answer all his mail but cannot promise individual replies.





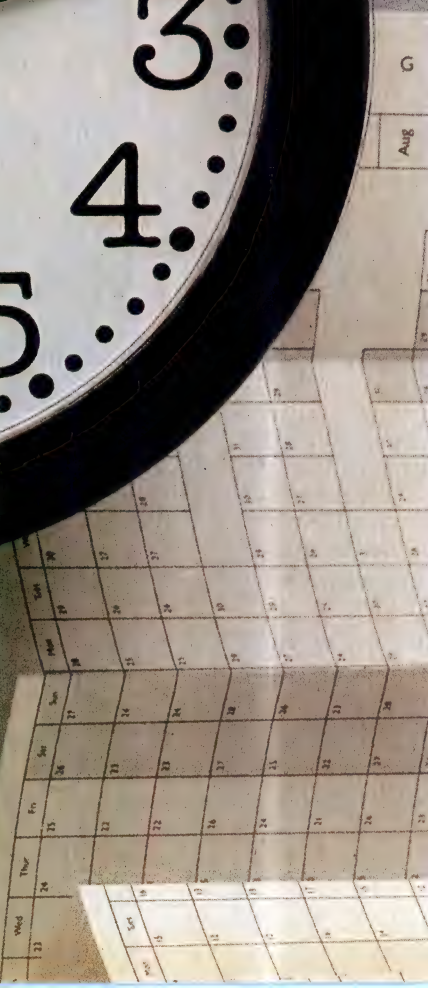


# DESK ACC



**SPECIAL REPORT**

**BY JOEL C. DON**





# ESSORIES

## MINI-PROGRAMS THAT WORK WITH YOUR APPLICATIONS WITHOUT GETTING IN THE WAY

**P**ICTURE THE TYPICAL OFFICE desk: a stack of Rolodex cards begging to be filed, appointments in a desk calendar mauled by scores of erasures, scraps of paper with notes, reminders, to-

do items, and other scribblings scrambled over every remaining square inch of desk space. In the middle of it all, a pocket calculator doubles as a paperweight. When the phone rings, it's pandemonium—there's nowhere to take a note.

Ironically, this situation has even existed on desks with computers, because while the machine was busy with word processing or spreadsheet calculations it wasn't available for anything else. But as the price of RAM chips fell, computer memories got bigger and bigger, making it possible for software developers to design mini-applications that would use the extra RAM to work alongside your main application program without getting in its way.

Logic demanded that these mini-programs provide the little things you might need while you are in an office working hard on a spreadsheet or a report—things like a place to jot a short note, an on-screen calculator, or a computerized phone book. And so, desk accessories were born.





	MY DESK	POLYWINDOWS DESK	POP-UP DESKSET PLUS	SIDEKICK	THE DESK ORGANIZER	SPOTLIGHT
<b>NOTEPAD</b>						
Print text	N/A	Y	Y	Y	Y	Y
Word wrap	N/A	Y	Y	Y	Y	Y
Move text blocks	N/A	Y	Y	Y	Y	N
ASCII format	N/A	N	Y	Y	Y	Y
Maximum file size	N/A	64K	3500 char.	45K	2500 char.	5500 char.
Import text	N/A	Y	Y	Y	N	N
<b>ROLODEX-TYPE CARD FILE</b>						
Total number of cards or records	15,000	*	N/A	N/A	disk capacity	18,000
Customized cards	Y	Y	N/A	N/A	Y	Y
Search cards	Y	Y	N/A	N/A	Y	Y
Sort cards alphabetically	Y	Y	N/A	N/A	Y	Y
Print cards or mailing labels	Y	Y	N/A	N/A	Y	Y
<b>MONTHLY CALENDAR</b>	Y	Y	Y	Y	Y	Y
<b>APPOINTMENT CALENDAR</b>	Y	Y	N	Y	Y	Y
<b>CLOCK</b>						
Running clock	Y	Y	Y	N/A	Y	Y
Alarm	Y	Y	Y	N/A	Y	Y
<b>CALCULATOR</b>						
Running "paper tape" on screen	N	Y	Y	N	Y	N
Print "paper tape"	Y	Y	Y	N	N	N
Memory constant	Y	N	Y	Y	Y	Y
Export calculations to application	N	Y	Y	Y	N	Y
<b>VOICE COMMUNICATIONS</b> (auto-dial)	Y	Y	Y	Y	Y	Y
<b>MODEM COMMUNICATIONS</b> (databases, bulletin boards)	N	N	Y	N	N	N
<b>EXECUTE DOS COMMANDS</b>	N	N	Y	N	N	Y
<b>CUSTOMIZE WINDOW SIZE</b>	N	Y	N	Y	N	N
<b>CUSTOMIZE WINDOW OR FEATURE LOCATION</b>	N	Y	Y	Y	N	Y
<b>ON-LINE HELP</b>	Y	Y	Y	Y	Y	Y
<b>COPY PROTECTED</b>	Y	Y†	N	Y†	N	Y

\*Limited by available RAM

†Unprotected version available

These programs, with names like SideKick and Spotlight and The Desk Organizer, are increasingly popular, and new entries are coming to market all the time. The packages have many similarities and some substantial differences.

Generally, desk accessories remain invisible until you want to use them, hidden on disk or in memory, just a few keystrokes away. As a rule, they operate in windows that overlay your main application. When you call up a desk accessory, you temporarily exit your main program. When you are done, you return to your exact point of departure. The best accessories even let you move information to and from your main application.

Because they are either stored in RAM or must sidle into RAM when in use, accessory programs can bite off a sizable chunk of memory. For

that reason, most desk accessories have been developed for the IBM PC and compatibles with at least 128K bytes of RAM, and there's a steadily growing library for the Macintosh (see "Desk Accessories for the Macintosh" on page 63). Memory limitations make it unlikely that many such programs will be developed for computers with only 64K bytes of RAM.

I looked at six of the most popular desk-accessory programs for MS-DOS computers, comparing them feature for feature. Originally, I thought there would be a clear winner. But after several weeks of examination, no single program soared above the others. Some came close, offering applications to manage just about every office activity. But each program lacked an ingredient or was plagued by some little weakness. All of the features that I'd look for in the ideal desktop organizer already ex-

ist—they just reside on different programs.

### The Right Stuff

Choosing the best desk-accessory package for your needs requires an understanding of your work habits. First, determine which features are essential to you. Then match your preferences with the programs. Here are some points to consider:

■ Notepad—Some desk-accessory programs offer full-screen notepads for letters and longer documents. Word-wrap, which automatically moves the words to the next line when you reach the righthand margin, is necessary if you plan to use the notepad to write more than a memo here and there. Editing commands range from bare essentials such as insert and delete to block moves, automatic reformatting, and file merges. Some programs can import text from a main application to

Joel C. Don is a California-based freelance writer specializing in science and medicine.



- **Calculator**—Most calculators use screen graphics to imitate the hand-held variety. Some even simulate a printer tape on-screen and let you print your number-crunching ses-

[illegible]

**Polywindows Desk,**  
Polytron, POB 787,  
Hillsboro, OR 97123;  
(503) 648-8595, (800)  
547-4000 (orders only);  
price: \$49.95/\$84.95 un-  
protected; minimum  
memory required: 128K  
bytes; systems: IBM  
PC, XT, AT, and com-  
patibles

Dir. MANN

Jun 1985

69.95  
69.98  
69.95  
209.85

209.45

Bellco

Press R for Help

TIME: 12:00  
DATE: 6/10/85  
TIME: 12:00  
DATE: 6/10/85  
TIME: 12:00  
DATE: 6/10/85  
TIME: 12:00  
DATE: 6/10/85

Alarm Message 4/8/85 11:54

10:10 Meet w/Dir. Managers  
10:40 Lunch with client

PL 100

Bellco  
Speed  
Store  
PL for Help

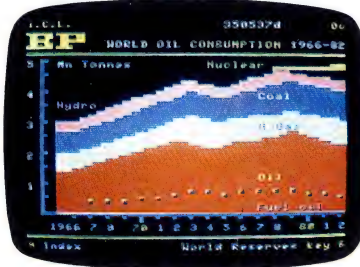
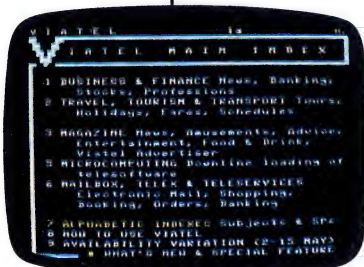
Once you've decided which features you most need, there are other considerations. Foremost among them is compatibility. Desk accessories are designed to stay out of the



# You can bank on the Bee!

## Information Window to the World

Microbee brings direct low cost communications to Schools, Homes and Businesses through a number of emerging facilities worldwide. With the addition of the Telecom approved beemodem, any microbee becomes your information window to the world.



The beemodem operates at 300 or 1200/75 BAUD.  
beemodem . . . \$189.50

## Austpac Telecom's X25 Revolution

Austpac opens the gateway to the world of data transmission, offering organisations and individuals a window to the world of computer communications and data base access, heralding a giant leap forward in telecommunications. Networks, a buzz word of not long ago are now a reality. Telecom's Viatel Gateway now links microbee's in Homes, Businesses and Schools with Viatel Service Providers, offering services, information and goods as many as they are varied. The communications horizon has indeed increased for microbee users.

## The microbee/Viatel Option

Viatel, Telecom's exciting new interactive videotext system is now in full operation and even more exciting, it's available on the microbee, Australia's own Educational, Home and Business Computer.

The Viatel Option is a hardware/software modification for any microbee, that used in conjunction with a 1200/75 BAUD beemodem will bring information, banking, news, weather reports, software and much, much more into your school, home or business for not much more than the cost of a local phone call . . . Microbee/Viatel Option . . . \$49.50

## Instant Access to Information

By utilising the existing telephone network, Viatel gives domestic and business users instant access to





information and services available through the central Viatel computer.

Information is received through your microbee personal computer fitted with the Viatel Option. You can even have a printer connected to your microbee.

## So Simple to Use

Press a key on your microbee and you enter the Viatel system. Enter your personal password and you get the index. From here you can call up information from hundreds of different sources and see it displayed on your screen. It's that simple.

A registered Viatel user can enter the system from anywhere in Australia for the cost of a local phone call. 24 hours a day. All you need is your password and in most instances, a standard telephone service.

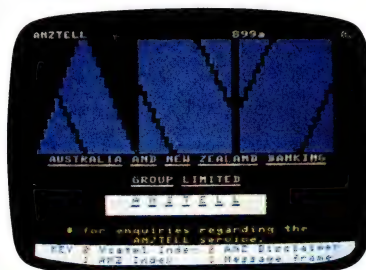


## A Two-Way System

Telecom Viatel does more than just provide you with information. It also lets you act on it. Imagine the convenience of being able to place orders, confirm bookings . . . even make payments through the system. And you're not limited to communicating just with the people who provide the information. You can also send messages to other Viatel users. And remember, with Viatel, all your communications are instant and confidential.

## Bank on the Bee

You can bank, shop, learn and exchange ideas on a microbee, fitted with the Viatel Option. What's more, you can first store, then retrieve a number of screens of information for use later when off-line. This particular feature will prove a real boon to those monitoring exchange rates, weather patterns, stocks and commodity prices.



## Electronic Mail

Already in use in Western Australian Schools, microbee's with beemodems are linking together in information exchanges and speeding up inter school communications.



Designed and manufactured  
in Australia by  
Applied Technology

# microbee

## computer

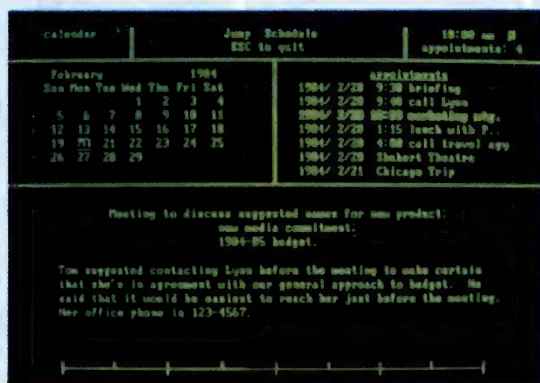
PHONE ORDERS  
 ACCEPTED

### microbee technology centres

- N.S.W. 1 Pattison Ave, Waitara 2077 Phone (02) 487 2711 - 2/956 Hunter St, Newcastle West 2302 Phone (049) 61 1090
- VIC. 50-52 Whitehorse Rd, Deepdene 3103 Phone (03) 819 5288
- W.A. 141 Stirling Highway, Nedlands Phone (09) 386 8289
- S.A. 117-119 Gouger St., Adelaide 5000 Phone (08) 212 3299
- QLD. 455 Logan Rd, Stones Corner 4120 Phone (07) 394 3688
- FACTORY Koala Crescent, West Gosford 2250 Phone (043) 24 2711 — microbee educational technology centre
- Unit 2, Eden Park Industrial Estate, 31 Waterloo Rd, North Ryde 2113 Phone (02) 888 9940.



**SideKick**, Borland International Corp., 4113 Scotts Valley Dr., Scotts Valley, CA 95066; (408) 438-8400; price: \$54.95/\$84.95 unprotected; minimum memory required: 64K bytes; systems: IBM PC, XT, AT, PCjr, and compatibles



**The Desk Organizer**, Warner Software, 666 Fifth Ave., New York, NY 10103; (212) 484-3070; price: \$99; minimum memory required: 170K bytes RAM-based/98K bytes disk-based; systems: IBM PC, XT, AT, PCjr, compatibles and Apple Macintosh

**Spotlight**, Lotus Development Corp., 55 Cambridge Parkway, Cambridge, MA 02142, (617) 577-8500; price: \$75; minimum memory required: 75K bytes; systems: IBM PC, XT, AT, and compatibles



way of your main application, but minor problems frequently occur. Be sure to test the accessory program with the applications you use, just to make certain no conflicts exist. If you use only well-known, popular software, such as WordStar, dBASE III, or Lotus's 1-2-3, you shouldn't have any trouble.

It is with the less popular programs that the conflicts arise, causing one or both programs not to perform as advertised. Conflicts crop up

especially if your main applications use combinations of Alt, Control, Shift, or Esc key sequences to perform commands—the same keys often used to summon the desk accessories. So try before you buy.

Desk-accessory packages come in two flavors—RAM-resident or disk-based. RAM-resident programs load into memory and are instantly accessible. Disk-based programs require disk access, which makes them noticeably slower; you also must

have the proper disk in your drive in order to load the program on demand. The benefit of disk-based programs is that they load only the accessory application you need, so they use less RAM than packages that load an entire program into RAM. Nonetheless, I prefer the RAM-resident programs. The speed—once you're accustomed to it—is a great advantage.

## The Programs

The programs discussed below are the best of the ever-growing pack. Again, all had strengths and weaknesses, and none stood head and shoulders above any other. In addition to these thumbnail evaluations, the table on page 60 offers detailed information on each program.

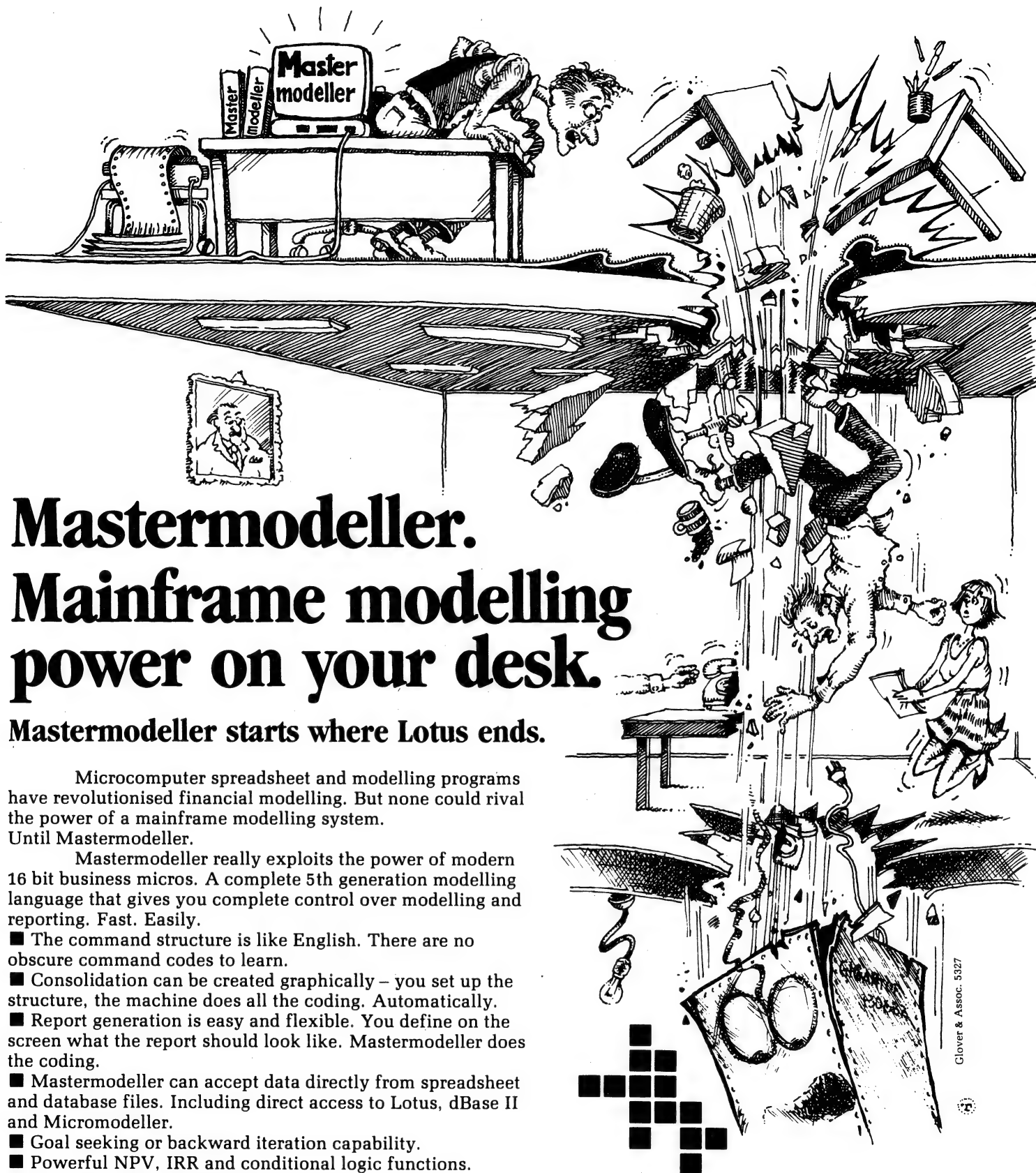
**MY DESK** IS AN EASY-to-use program designed to link the power of your computer with a host of telephone features. It comes with its own communications interface card that must be inserted in a peripheral slot in the computer.

My Desk runs either as a disk-based program or, if you have the memory, a RAM-based program. It relies on the IBM's 10 function keys to perform most of its operations. Function keys are depicted on the left side of the screen with labels indicating various operations.

At the heart of My Desk is a sophisticated telephone management system that can tap into most office PBX systems. You can also use the program to take advantage of premium telephone features, including call hold, call forwarding, automatic call back on busy signal, call transferring, conference calling, speed dialing, and call waiting. (My Desk Jr., a trimmed-down version, works with a Hayes-compatible modem but doesn't handle the premium telephone features.) There's also a phone message system for recording times and dates of your calls. Clock watchers will appreciate a function that times phone calls. The time can be automatically logged on your disk for billing records.

In addition to the telephone capabilities, My Desk comes with a sampling of desktop management features, including a well-designed Rolodex-type card file, an alarm





# Mastermodeller. Mainframe modelling power on your desk.

**Mastermodeller starts where Lotus ends.**

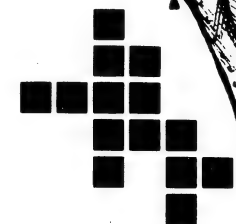
Microcomputer spreadsheet and modelling programs have revolutionised financial modelling. But none could rival the power of a mainframe modelling system. Until Mastermodeller.

Mastermodeller really exploits the power of modern 16 bit business micros. A complete 5th generation modelling language that gives you complete control over modelling and reporting. Fast. Easily.

- The command structure is like English. There are no obscure command codes to learn.
- Consolidation can be created graphically – you set up the structure, the machine does all the coding. Automatically.
- Report generation is easy and flexible. You define on the screen what the report should look like. Mastermodeller does the coding.
- Mastermodeller can accept data directly from spreadsheet and database files. Including direct access to Lotus, dBase II and Micromodeller.
- Goal seeking or backward iteration capability.
- Powerful NPV, IRR and conditional logic functions.
- Unlimited use of variables and ONERROR.

Sound interesting? To get a hands-on demonstration of Mastermodeller, call Intelligence Australia today. It's a lot cheaper than a mainframe. And takes up a lot less desk space.

Mastermodeller runs on IBM PC, IBM compatible, DEC, Hewlett-Packard, Wang, Sirius and Apricot microcomputers.



**Intelligence**

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(08) 373 0222  
Brisbane: (07) 343 9122 Perth: (09) 322 1677

Glover & Assoc. 5327



clock, a calculator, and monthly and daily calendars. The appointment calendar has preset times, or you can define your own. You can store telephone numbers in the card file and search for records with the speed and efficiency of a dedicated database system. Unfortunately, the Rolodex fields are already defined, though they include most of the categories in a typical card file.

The only drawback to My Desk is its lack of a notepad. Instead, you must use to-do lists for jotting down important items in line-by-line format.

## **POLYWINDOWS**

**DESK** HAS MOST OF THE ingredients you'd expect to find in a well-rounded desk-accessory program, minus modem communications and a flexible notepad. The program also includes an unnecessary child's puzzle.

The Polywindows Desk notepad is hampered by size limitations. It can't be expanded beyond 71 columns by 10 lines. But the notepad features automatic reformatting after inserting or deleting text, and there's even an undo feature that recovers any amount of text that is accidentally erased. The latest version of the program (2.0) also lets you import and export text from other applications.

The Polywindows Desk card file uses screen graphics to imitate a typical Rolodex card set. You can create a variety of card sizes and customize your fields. The card file can be searched quickly using an index tab; you needn't worry about upper or lower case or whether you have typed the complete name exactly as listed. It can be printed on continuous-form Rolodex cards or mailing labels, though the printing options are limited to just the current card or the entire deck.

Polywindows includes a macro key feature. With it, you can make one key do the work of many to execute commands or type text strings. The macro key is not as powerful as in dedicated programs like ProKey, but it is more than adequate for simple applications.

## **POP-UP DESKSET PLUS**

OFFERS A WIDE ARRAY of features, though it lacks some basic functions. Although the company claims the program takes only 150K bytes of RAM to run all the features, I found it took 171K bytes. However, you have the option of easily including or excluding any of the features to save memory.

The program has a full-featured clock with alarm, snooze alarm, stopwatch, and the ability to export the time and date to your application program. In addition you can set the alarm clock so that it executes designated keystrokes or runs a program when you're away from the computer. However, the clock is in the military time format.

Pop-Up has an excellent full-screen calendar that mimics an office wall calendar. You can insert annual holidays and other recurring events in any square. You can also print these calendar displays for reference. But, odd as it may seem, the program has no appointment calendar.

The auto-dial and modem features are excellent, although you can store only three numbers for voice calls and three numbers for on-line databases. The modem allows you to import data from the screen and send and receive text files. All that's missing is the ability to turn on the printer while you're on-line. (A less expensive version, called Pop-Up DeskSet, lacks the telecommunications features.)

Pop-Up's notepad is 35 columns wide, but it scrolls down page by page to accommodate a total of 3500 characters. Its clipboard serves as a temporary holding area for text being moved between applications. Neither of these tools works as a stand-alone word processor.

In addition to its standard calculator functions, Pop-Up's calculator has extra options that require more memory. These extras let you calculate interest, annuities, depreciation, and a variety of statistical functions.

One nice touch is Pop-Up's ability to execute DOS commands from within an application. You can call up

a disk's directory of files, copy files from one disk to another, rename files, examine the contents of a file, check remaining disk space, delete a file, or change disks or directories.

You can also print a file from the DOS commands window or turn your computer into a direct-linked typewriter, an excellent feature if you want to address envelopes or make labels. Pop-Up also lets you send special control codes for enhanced typefaces on dot-matrix printers.

**SIDEKICK** IS THE LOTUS 1-2-3 of desk accessories. In fact, at this writing it is the number-two-selling software package, behind 1-2-3. It's easy to use and offers exceptional flexibility. But it is also missing some essential features and carries extra baggage.

SideKick appears to have been designed with programmers in mind. One feature displays the codes for all 256 ASCII characters. Several RAM-saving versions of the program minus various features are available, but there is no version without the ASCII window. Likewise, the calculator is more complex than most users need it to be, with its hexadecimal and binary computation capabilities.

The heart of SideKick is the notepad, which can act as an alternate word processor. If you use WordStar, you'll be right at home, because the notepad employs many of WordStar's control key commands. Luckily SideKick differs from WordStar in one substantial way—it stores text as ASCII files that can be edited by many word-processing packages. One of Sidekick's best features is the ability to import on-screen data from any application program into the notepad. Word-wrap, automatic reformatting, and the ability to export text have recently been added in version 1.5 of SideKick.

Though SideKick lacks a Rolodex-like card file, you can improvise lists of names and addresses by using the notepad in conjunction with the simple search capabilities of the dialer. The auto-dialer can call any number from your application program as well as any of those stored in your



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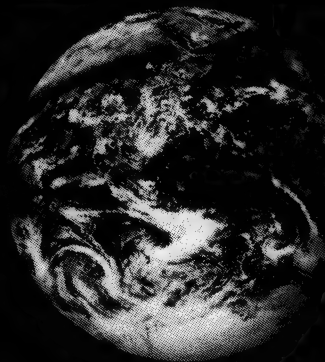
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phone directory text file.

The size and location of SideKick windows can be changed quickly and efficiently with a special setup window. Once you've changed the location of windows, you then store that version on disk for future use. The notepad window can be expanded to fill the screen or be compressed into a small box just 50 characters wide by 3 lines deep. SideKick's appointment calendar lets you create as many different calendars as you like, limited only by disk space. The appointment calendar is in half-hour increments, which is adequate, but I prefer calendars that let you enter variable times. And the program could use a clock and alarm.

## THE DESK ORGANIZER

A DISK-based desk accessory, requires that you keep the program or "key" disk in the drive when it's in use. The program includes an appointment calendar, filing systems, a notepad, and a telephone dialer. Unlike the other programs discussed here, this program's applications don't come up in windows overlaying your main application. Rather, you switch between The Desk Organizer and your main application.

The Desk Organizer is more complicated than other desktop packages, but it gives you enormous computing power. You can create your own structures for filing and retrieving information or use the program's filing systems to create multiple indexes. One index might be your appointment book, another a to-do list, a third your Rolodex file—you devise as many filing features as you like.

The Desk Organizer's notepad isn't designed to be a full-fledged text editor, but it includes reformatting capability, cut-and-paste, and the most common commands needed for basic text editing. One nice touch lets you program any one of the 10 function keys to act as a template for, say, a memo.

The calculator function is far more powerful than you might imagine. There is a standard keypad-type calculator, but you can also create formulas via the notepad for figuring

things like monthly loan payments, scientific equations, and rate of return on investments.

Because of the key-disk requirement, The Desk Organizer can be annoying if you have only two disk drives. A hard-disk drive, though, makes it less cumbersome to use.

**SPOTLIGHT**, TOO, REQUIRES a key disk, and it is copy protected: you are limited to two copies of the master disk. It sports a barebones text editor with the simplest of editing capabilities and no way to expand the editing window beyond 39 columns by 5 lines. A clock is displayed in the notepad and calculator.

Spotlight's strong point is the appointment calendar—in fact, it is the best in the bunch. You can enter meetings at any time of the day and schedule recurring meetings through the calendar. What's more, it's possible to show graphically how long a meeting will last. The appointment book can be customized in 15-, 30- and 60-minute intervals. And the alarm can be set to beep up to 10 minutes before an appointment.

The program also has a phone list that features quick access to numbers and names. Its auto-dialer can call voice numbers only. For those who want access to DOS, Spotlight offers a select group of DOS commands, including commands to format disks, copy and rename files, delete files, examine the contents of files, and sort files by date/time, extension, name, and size.

### The Best Choice

As I mentioned earlier, choosing the right desk-accessory program requires that you analyze your needs. If you use the phone a lot, you will prefer a program with good telephone capabilities and a good notepad. If you frequently use a modem, you'll want a program that supports modem communications.

One thing is certain, though. Once you use a desk-accessory program, you'll wonder how you ever did without one. These mini-applications are considered adjuncts to your main applications, but you'll find them as essential to your office as a notepad and calculator used to be. □



# Secret Writing

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*Explore the craft of cryptography with your computer*

by George Stewart

**S**ecret writing, or cryptography, is the craft of hiding information by converting it into a code that looks like nonsense. Only by using the proper password or key can a reader unlock the code and reveal the secret message. This month we'll present a program that turns your computer into a secret-writing machine, using a simple and ancient cryptographic technique known as the Caesar cipher.

The Caesar cipher, used by Emperor Julius Caesar, shifts each letter of the original message forward in the alphabet by a specified distance, called the key. For instance, with a key of 3, the letter A is shifted forward to become D. If we reach the end of the alphabet while shifting a letter forward, we simply continue at the beginning of the alphabet. Thus, with a key of 3 the letter Y becomes B. Keeping with a key of 3, the message:

THE APPLES ARE RIPE

becomes the encoded message:

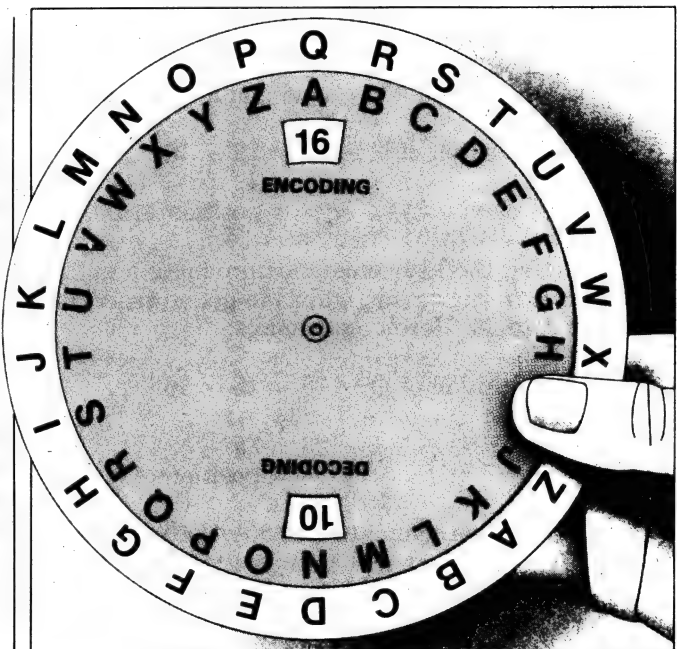
WKH DSSOHV DUH ULSH

To decode the secret message, we shift each letter in the coded message back by the same key. In this case, we shift W back 3 to get T, K back 3 to get H, and so forth.

Shifting letters backward and forward is tiresome. A cipher wheel, shown at right, makes the job much easier. We'll use the cipher wheel to help explain how our computerized cipher machine works.

## The Cipher Machine

Let's start with a short description of the cipher machine's duties. First it asks you to type in the key, select encoding or decoding, and type in the message. The computer picks out the first letter of the message, encodes or decodes the letter, and prints the coded letter. Then the computer picks out the next letter in the message (ignoring spaces and punctuation) and encodes



A cipher wheel, shown set for encoding with a key of 16. For decoding, the inner wheel is rotated until the key appears in the Decode window.

or decodes that letter. It repeats the process until no more letters are left to be coded.

A closer look at the cipher wheel suggests a way for the computer to encode or decode a letter. Suppose the key is 16. We rotate the inner wheel until 16 appears in the Encode window, as shown in the figure. Notice that the first letter of the alphabet (A) is paired with the 17th letter (Q). The fourth letter of the alphabet (D) is paired with the 20th letter (T). In abbreviated form:

$$\begin{aligned}
 \text{position of A} + 16 &= 1 + 16 \\
 &= 17 \\
 &= \text{position of Q} \\
 \text{position of D} + 16 &= 4 + 16 \\
 &= 20 \\
 &= \text{position of T}
 \end{aligned}$$



Occasionally, the sum of the letter position and the key exceeds 26, the last position of the alphabet. In these cases, we subtract 26 from the sum and use that as our final result. For example:

$$\begin{aligned} \text{position of Y} + 16 &= 25 + 16 \\ &= 41 \\ 41 - 26 &= 15 \\ &= \text{position of O} \end{aligned}$$

Let's put the encoding process in a general form:

$$\text{position of letter} + \text{key} = \text{position of coded letter}$$

We can derive an equation for decoding messages simply by rearranging the encoding equation:

$$\text{position of coded letter} - \text{key} = \text{position of letter}$$

For instance, given a key of 16 and a coded letter T:

$$\begin{aligned} \text{position of T} - 16 &= 20 - 16 \\ &= 4 \\ &= \text{position of D} \end{aligned}$$

Subtracting the key sometimes produces a number less than 1. In such cases, add 26 to get a result in the range of 1 to 26. Here's an example:

$$\begin{aligned} \text{position of O} - 16 &= 15 - 16 \\ &= -1 \\ -1 + 26 &= 25 \\ &= \text{position of Y} \end{aligned}$$

In summary, the computer encodes a letter by adding the key to the letter's alphabet position. If the result exceeds 26, the computer subtracts 26. The computer decodes a letter by subtracting the key from the letter's alphabet position. If the result is less than 1, the computer adds 26.

### The BASIC Program

The program is written in Microsoft BASIC and should run without modification on most personal computers. It uses four special BASIC functions to accomplish the ciphering. All of these functions perform operations on strings (sequences of letters and other characters).

LEN measures the number of characters in a string. For instance, PRINT LEN(M\$) prints the length of the string M\$. The program uses LEN to determine the number of characters in the message to be encoded or decoded.

MID\$ picks out one or more letters from a string. For instance, MID\$ (message, position, length) gives us a portion of the message starting at the stated position and running for the stated length. In the cipher program, MID\$ picks out one at a time the characters

of the message to be encoded or decoded.

ASC gives us the numeric position of a letter in the alphabet. For instance, ASC("A") gives the position of the letter A. However, the computer uses the ASCII (American National Standard Code for Information Interchange) alphabet, which contains 256 characters. Capital letters A through Z, which we use in this program, occupy positions 65 through 90 in the ASCII alphabet. Thus ASC("A") gives the number 65, ASC("M") gives 77, and ASC("Z") gives 90.

CHR\$ is the opposite function of ASC. It finds the letter corresponding to a position in the ASCII alphabet. For instance, CHR\$(65) gives the letter A, since A occupies position 65 in the ASCII alphabet. The program uses CHR\$ to find out what letter results from adding the key to the original letter's position (encoding) or subtracting the key from the original letter's position (decoding).

The following variables are used in the cipher program:

Variable	Definition
LB	ASCII position of first letter (A)
UB	ASCII position of last letter (Z)
K	key
CH\$	choice of encoding or decoding
M\$	message
P	pointer (indicates the current letter)
X\$	letter pointed to by P
Y\$	encoded or decoded letter
YP	ASCII position of Y\$

The complete program listing is shown below. Type it in carefully and compare your work line by line against the printed listing.

```

10 LB=65
20 UB=90
30 PRINT "SECRET WRITING MACHINE"
40 PRINT
100 INPUT "ENTER THE KEY (1-25) "; K
110 IF K<1 OR K>25 THEN 100
200 INPUT "ENTER E TO ENCODE OR D TO
    DECODE ";CH$
210 IF CH$<>"E" AND CH$<>"D" THEN 200
300 PRINT "ENTER THE MESSAGE"
310 INPUT M$
320 IF M$="" THEN 300
400 FOR P=1 TO LEN(M$)
410 X$=MID$(M$,P,1)
420 IF X$>="A" AND X$<="Z" THEN 500
430 Y$=X$
440 GOTO 600
500 IF CH$="D" THEN 540
510 YP=ASC(X$)+K
520 IF YP>UB THEN YP=YP-26
530 GOTO 560

```

---

George Stewart is a contributing editor of *Popular Computing*. Program Factory is a trademark of the author.



```

540 YP=ASC(X$)-K
550 IF YP<LB THEN YP=YP+26
560 Y$=CHR$(YP)
600 PRINT Y$;
700 NEXT P
800 PRINT
810 PRINT "DONE"
820 END

```

A sample run of the program is shown below.

### Going Further

The cipher program presented here works only with capital letters. You can change the program so that it will work with lowercase letters, punctuation symbols, and many more characters that you find on your keyboard.

These additional characters occupy different ranges in the ASCII alphabet. Common punctuation and arithmetic symbols occupy ASCII positions 33 to 47. The numerals 0 to 9 occupy positions 48 through 57. Certain punctuation marks and special symbols occupy positions 58 through 64. Capital letters run from 65 to 90, as we saw earlier. More special symbols occupy positions 91 to 96. The lowercase alphabet occupies positions 97 to 122.

To find out which character occupies a certain position in the ASCII alphabet, type in the command `PRINT CHR$(code)`, replacing *code* with a number from 0 to 255.

To find out the position a character occupies in the ASCII alphabet, type in the command `PRINT ASC("character")`, replacing *character* with a single keyboard character.

You can find all 75 characters in the ASCII alphabet from positions 48 through 122 on the keyboard. To modify the program so that it will process any of these characters, make these changes:

#### SECRET WRITING MACHINE

```

ENTER THE KEY (1-25)? 3
ENTER E TO ENCODE OR D TO DECODE? E
ENTER THE MESSAGE
? THE APPLES ARE RIPE
WKH DSSOHV DUH ULSH
DONE
OK
]
]RUN
SECRET WRITING MACHINE

```

```

ENTER THE KEY (1-25)? 3
ENTER E TO ENCODE OR D TO DECODE? D
ENTER THE MESSAGE
? WKH DSSOHV DUH ULSH
THE APPLES ARE RIPE
DONE

```

In this sample run, the program uses a key of 3 to encode and decode messages.

Line 10: change 65 to 48  
 Line 20: change 90 to 122  
 Line 100: change 25 to 74  
 Line 110: change 25 to 74  
 Line 420: change "A" to "O" and "Z" to "z"  
 Line 520: change 26 to 75  
 Line 550: change 26 to 75.

To change "Z" to "z" in line 420, for some computers you might first have to find out how to type in lower-case letters. □

If you have questions about this program or suggestions for future projects, send them to: George Stewart, The Program Factory, POB 137, Hancock, NH 03449. Enclose a self-addressed, stamped envelope if you want a reply. For programming questions, include a program listing, sample run, and brief description of your problem.

**Editor's Note:** George Stewart's book, *The Apple Program Factory* (Osborne/McGraw-Hill, 1984, \$11.95) is a collection of 20 programming projects, most of which have appeared in these pages. The programs have been revised and enhanced for computers with Applesoft BASIC to make use of features like graphics, disk files, and sound. A Commodore 64 version of the book is also available.



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## Weighty Money Matters

by Michael W. Ecker

**T**his month's column responds to popular demand. The problem has been suggested many times during the past year, most recently by Dr. David Grossman of IBM's T.J. Watson Research Center, Yorktown Heights, New York. But his solution, which I'll show you next time, is so interesting that I decided now is the time to offer the challenge.

You have 12 coins that seem identical. All weigh the same, with one possible exception. There may be one slightly lighter or heavier counterfeit coin, but there may not. Your BASIC program should allow you to input your choice of these possibilities. Then, using only three weighings on a balance scale, it should be able to determine that all the coins are indeed genuine or identify the fake and confirm that it is lighter or heavier than the others. You may place any number of coins on each side of the scale for any one weighing.

Obviously, the solution is easy if all the coins are real; the hard part is identifying a fake. Readers may recall an earlier problem (March 1984) with bags of coins. This one is much more sophisticated; if you're looking for a real programming challenge, this is your month. Hint: as a computer user, you're familiar with the binary (base 2) number system. Dr. Grossman's solution uses the ternary (base 3) system.

Dr. Michael W. Ecker is an associate professor in the Department of Mathematics and Computer Science at the University of Scranton.

### Solution to "Crazy Cancellation"

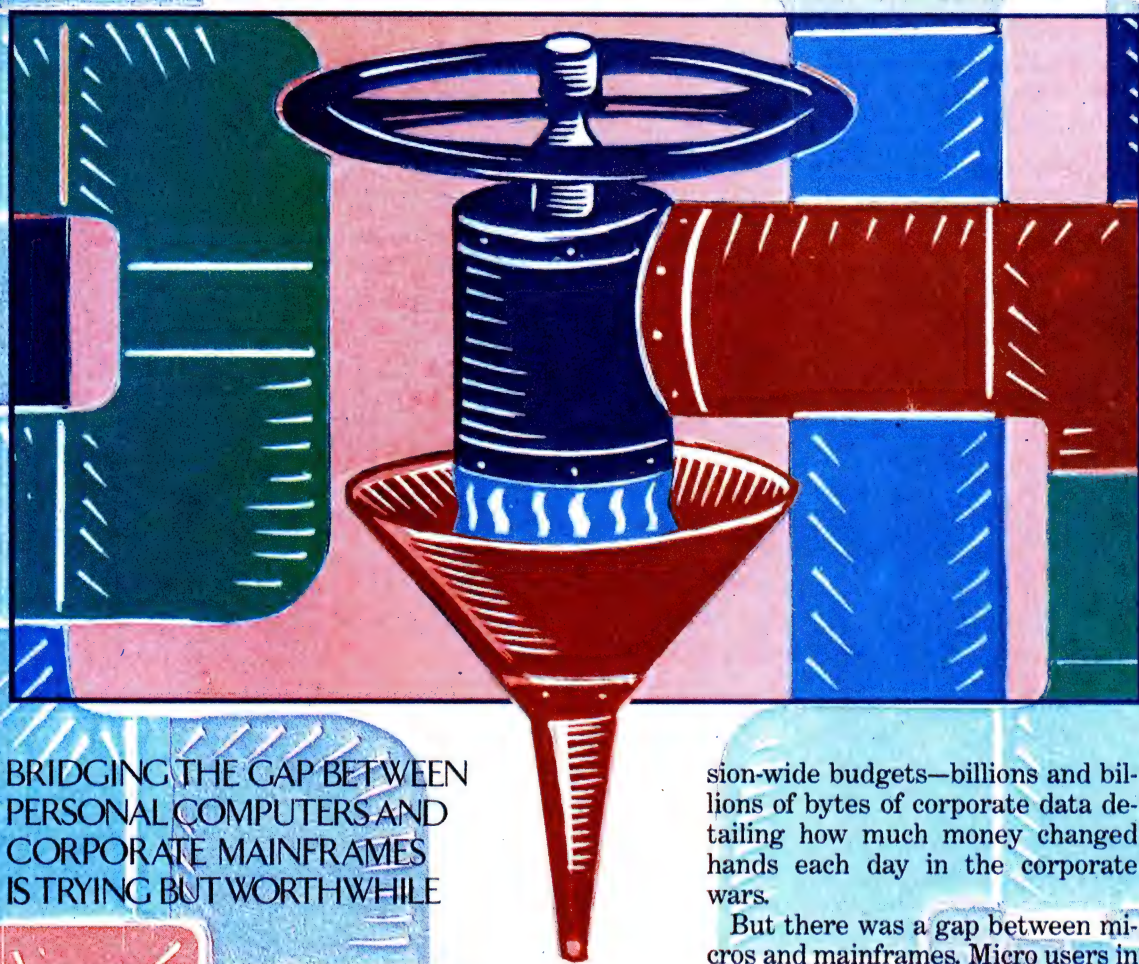
```

10 PRINT
20 PRINT "This program finds incidences"
30 PRINT "of coincidentally correct"
40 PRINT "cancellations, as in 16/64=1/4"
50 PRINT "(canceling the sixes)."

```



# MICRO-TO-MAINFRAME LINKS



BRIDGING THE GAP BETWEEN  
PERSONAL COMPUTERS AND  
CORPORATE MAINFRAMES  
IS TRYING BUT WORTHWHILE

BY ARIELLE EMMETT

**B**Y THE EARLY 1980s, WE ALL became aware of the separate advantages of microcomputers and mainframes. Micros gave us, at last, the power to compute on our own; they combined analytic skill, flexible software, and fast response time in one easy-to-use package. Mainframes held all the information that really counted: banking transactions, manufacturing inventory, departmental and divi-



sion-wide budgets—billions and billions of bytes of corporate data detailing how much money changed hands each day in the corporate wars.

But there was a gap between micros and mainframes. Micro users in large companies needed to get at "live" (current) mainframe data, extract only what they needed, and download it to their personal computers where they could analyze it with their micro-based applications and report-writing tools. Mainframes, too, had problems. Despite their enormous capacity for data storage, they sometimes were overburdened and could profitably dump some of their processing tasks on micros.

A link—a marriage of advantages

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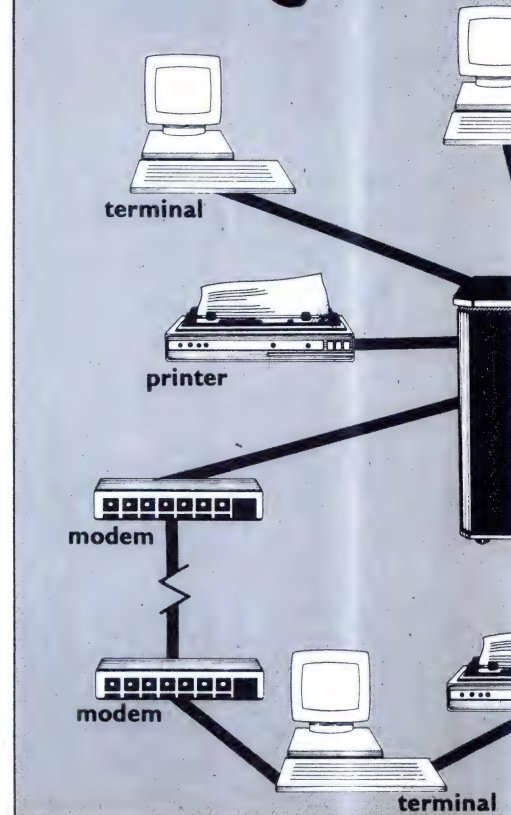
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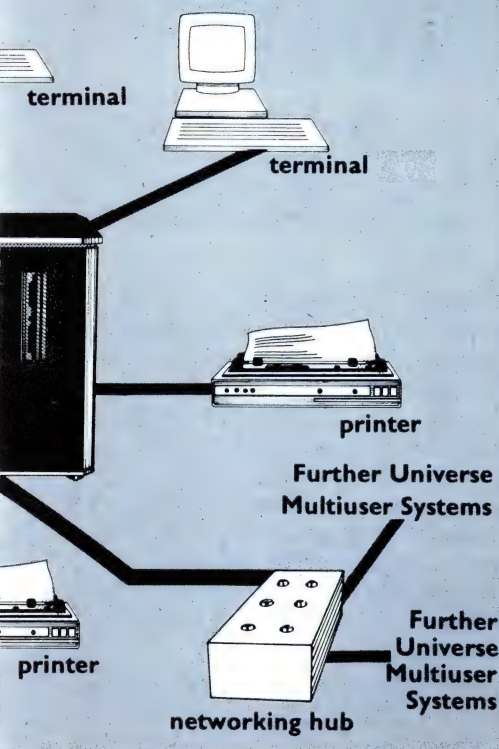
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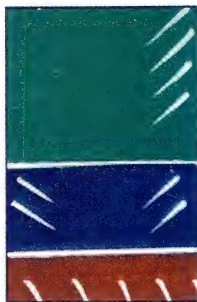
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—was needed. With the proper connection, the mainframe could act as a central hub, a storage vault for files that micros could access and share. Electronic mail could fly between users. Databases, programs, and processing chores could be shared by dissimilar machines. Micros could also act as data storage devices that would be “polled” (called up) by a mainframe, which would automatically collect data for use in billing, budget reviews, and other kinds of



tion differently. They could be outfitted to shake hands with micros—to physically connect with them—but they couldn't easily do much more than that.

Today, micro-to-mainframe links are still among the most perplexing problems and sought-after innovations in communications technology. At best, these links offer the potential of shared processing power, relief to overburdened mainframes, and a way out of

## PERPLEXING AND HIGHLY SOUGHT-AFTER, MICRO-TO-MAINFRAME LINKS OFFER THE POTENTIAL OF SHARED PROCESSING POWER, RELIEF TO OVERBURDENED MAINFRAMES, AND A WAY OUT OF KEYBOARD DRUDGERY.



essential number-crunching operations.

Mainframes in the DEC and IBM worlds were already sending bursts of data across phone lines or corporate coaxial cable networks. Host computers were dumping data to terminals, minicomputers, and peripherals via complex communication protocols that took care of network access, error-checking, and other functions. Surely there was a way to extend this highly sophisticated data transmission to microcomputers and the growing numbers of managers and professional people who used them.

But micro-to-mainframe links turned out to be thornier than anyone suspected. Mainframes obeyed much more complex transmission rules than micros; they spoke in different symbolic codes; they structured their informa-

a lot of keyboard drudgery. At worst, they're a rat's nest of conflicting vendor claims, start-up headaches, high costs, and plain old-fashioned confusion about what linking products can or can't do.

### Basic Dilemmas

**M**ICRO-TO-MAINFRAME LINKS ARE DIFFICULT to implement because of the complexity and variety of the tasks they set out to do. The main dilemma is getting selective access to live mainframe data. Selective access means being able to instruct the mainframe to give you exactly what you need when you request a file or data from several files. It also means retrieving that information without compromising the integrity of the mainframe data, fouling up its records, or violating corporate security.

“The micro has to be selective. Otherwise, it will be overwhelmed by mainframe data,”



Arielle Emmett is coauthor of *Direct Connections: How to Get Computers to Talk to Each Other*, to be published next year by New American Library.





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explains Thomas O'Flaherty, from Information Service Strategies, a consulting group in Wood-Ridge, New Jersey. "Instead of dealing with megabytes on a hard disk, you're dealing with gigabytes in a single mainframe file."

Once you access a particular mainframe file, you then have to be able to move the data to your personal computer and convert it into a format your microcomputer application program can use. Mainframe applications use different file structures than micro applications, and an efficient link must enable these unlike structures to share information. For example, if you want to transport files from a mainframe and load them into dBASE II, the information must be compatible with dBASE II's input format. By the same token, if you move data from a mainframe to your personal computer for analysis with 1-2-3, you must make sure your spreadsheet knows exactly how to put the figures and categories of information into the proper cells.

There's another element to consider before you can link your personal computer to a mainframe. Micros have to recognize and run with mainframe communications standards. The emerging de facto standard for mainframe communications is IBM's Systems Network Architecture (SNA), a set of protocols that defines how IBM products interact with each other. Terminals hooked to IBM hosts under the SNA scheme can work interactively with mainframe application programs. Micros that are to be linked to mainframes using SNA must conform to the same protocols.

Consequently, there's much concern about what IBM will do next. Of particularly keen interest today is an SNA building block called Logical Unit (LU) 6.2. The unit is the basis of what IBM calls Advanced Program-to-Program Communication, which is how IBM mainframes, minicomputers, and micros will eventually talk to each other. Under LU 6.2, micro and mainframe programs can exchange data in such a fashion that one program can do specialized work while the other directs the work, or two peer programs can share data. Some people see LU 6.2 as the beginning of true distributed data processing in a multi-computer environment. IBM has yet to extend the implementation of LU 6.2 to its own PC, though plans are in the works.

At present, though, the state of the art in micro-to-mainframe links is in flux. Vendors haven't settled on link standards, much less easy-to-use strategies. They are dealing with massive technical constraints—the most salient being the wide variety of mainframe file structures and the lack of adequate data security procedures to protect new data that you and other micro users might transfer to a mainframe. And vendors are still not sure just where to place their products in a market that hangs on every promise IBM makes.

## A Variety of Approaches

**T**HIS UNCERTAINTY IN THE marketplace means that you should consider carefully what kinds of information you want access to and how you want to use it. Moreover, micro-to-mainframe links can cost tens to hundreds of thousands of dollars. Before making or recommending such an expenditure, you'd be wise to learn all you can about link terminology and the pros and cons of the different types of links.

The term "link" refers to a variety of devices. A link can mean just a simple physical connection—the wire, cable, or dial-up phone line that attaches your personal computer to a mainframe. "Link" can also refer to a terminal emulator—a circuit board that lets you connect your personal computer to a phone line or coaxial network and then mimic the characteristics of a mainframe-linked terminal. A third type of "link" is a protocol converter—a device that lets personal computers switch from slow, asynchronous communications (their normal mode) to the ultra-fast, precisely timed synchronous communications that mainframes use.

Micro-to-mainframe links also include different types of software. First, there are software packages called application interface links. These higher-level links let personal computers download and manipulate data from certain application programs used by mainframes. A second category is database interface links, which give micros access to mainframe databases. The more sophisticated database interface links read a wide variety of mainframe database files and convert data into formats compatible with Lotus's 1-2-3, Symphony, dBASE II, VisiCalc, and other popular micro analysis tools. Each type of link—from simple dial-up phone lines to powerful database interface links—has tradeoffs.

## Low-Level Links

**P**HYSICAL LINKS, EITHER ASYNCHRONOUS or synchronous, are the lowest level of micro-to-mainframe links. In simple terms, you either get a mainframe to start communicating asynchronously (like a micro) or you make your personal computer "act dumb"—that is, mimic the qualities of a terminal, a monitor that displays screens of information imported from a mainframe.

With asynchronous links, mainframes are forced to obey the same communication rules that micros operate under. For this type of link a mainframe is outfitted with software that converts its internal code (all IBM mainframes, for example, use EBCDIC, short for Extended Binary-Coded Decimal Interchange Code) into the standard ASCII code that micros use. To complete the link, you attach any asynchronous, Bell-compatible modem to a serial port





## LINKS MICRO-TO-MAINFRAME

on the front-end processor in the mainframe and run some communications software.

With this type of link the mainframe communicates by using the same start bits, stop bits, and parity bits that your micro uses, and it transfers data in bytes, one bit at a time. The speed of such transmission is 1200 to 2400 baud via phone lines and 9600 baud or more with a hard-wired direct connection.

The clear advantage of this type of link is that it's cheap. Micros can tie in to the mainframe from a remote site using only a modem or a serial card and standard communications software. Nothing additional is needed. And if mainframe software is written to exchange error-checking messages, then a similarly equipped micro can download selected mainframe files with relative ease and accuracy.

Asynchronous links are slow, however, and they don't let micros talk to IBM hosts that are locked into synchronous SNA/SDLC (Synchronous Data Link Control) or Bisync protocols, two popular IBM mainframe protocols. For faster synchronous communications, you have to opt for a terminal-emulation package, usually to the tune of \$750 to \$1000 or more per unit. Terminal emulators let personal computers mimic the characteristics of mainframe-linked terminals like the IBM 3278 and 5251 or the DEC VT100. A terminal-emulation package combined with a file-transfer program translates mainframe data into ASCII code and sends it via coaxial cable to your micro. Similarly, it takes data expressed in ASCII code from your micro, translates it to the mainframe code, and sends it to a host computer.

Terminal emulation allows a mainframe to dump high volumes of data—often a whole screenful at a time—across a coaxial cable or dedicated phone line at speeds up to 19,200 baud without losing any of the data. It's the preferred method of communication in large organizations. Moreover, if micros are connected synchronously, then no additional hardware or conversions are required on the mainframe side.

### Restricted Capabilities

But the drawback of terminal emulation is that it restricts the processing capabilities of the micro. A terminal emulator is designed to make your computer act like a dumb repository of information—except that you can grab a screenful of data and save it on a disk or print it. (Some people call this "smart terminal emulation.") Most micro users with terminal emulators must reformat downloaded mainframe data for specific micro applications. You may be forced to write a BASIC program or buy additional software just to get your information into usable form. Otherwise, the data will just sit there waiting for you to rekey it into your application program.

Some vendors are dealing with this limitation by expanding the capabilities of their terminal-emulation packages. For example, the popular Irma board (the Irma Decision Support Interface, from DCA in Norcross, GA) gives you limited ability for file transfer. It can access selected mainframe files in the IBM VM and MVS operating systems and save downloaded files in ASCII code (text) or binary format. And DCA has expanded the Irma product line to include a board that allows asynchronous protocol conversions over remote phone lines. But whether you opt for an Irma board, a PCOX board (CXI Corp., Palo Alto, CA), a Blue Lynx board (Techland Systems, New York City), or any other type of board, terminal emulation is still only a low-level link strategy.

### Application Interface Links

Application interface links let your micro access subsets of files in specific mainframe application programs. These higher-level links almost invariably use terminal emulators to establish the basic physical connection. They also employ conversion templates, software formatting schemes, and file extraction utilities for selecting and reformatting files. These links are "two-package solutions": separate micro and mainframe programs produced by the same vendor.

One example is McCormack & Dodge Corp.'s (Natick, MA) Interac-

tive PC Link, which lets IBM PCs access information in McCormack & Dodge's financial applications and other applications that run on IBM System 370 and 4300 mainframes. Another application interface link is Management Science America's (Atlanta, GA) Executive Peachpak II with ExpertLink, which links your microcomputer to mainframe data stored in the package's accounting modules. Processing is shared. You can, for example, enter and validate budget transactions with your micro, then upload the information to the mainframe budget module. ExpertLink is pricey: \$3000 per micro package, less with volume discounts. Mainframe modules run between \$80,000 and \$100,000 each.

Another set of products, IBM's recently announced Personal Decision Series (PDS), provides a link between a specific application series (five software programs on the PC and PC XT) and the IBM System 370, 30XX, and 4300 mainframes, as well as System 36 minicomputers. A separate Business Management Series (BMS), a group of accounting and inventory programs for the PC, also exchanges files with the PDS system. The host computer requires a separate Attachment software package: a System 370, for example, requires either Attachment/MVS for \$20,000 or Attachment/VM for \$16,000. The corresponding micro package for connecting to a System 370 mainframe costs \$200.

### Universal Links

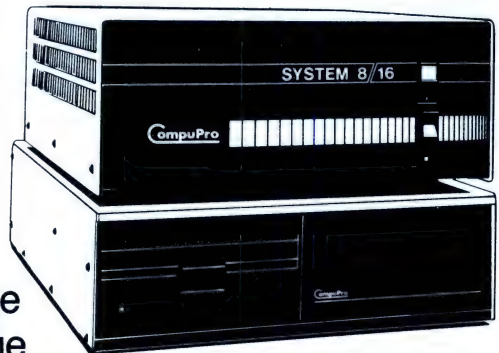
Still higher-level micro-to-mainframe links are more universal than application interface links, or at least they purport to be. Those known as database interface links allow you to select data from a variety of mainframe database file structures, then download that data into your micro for manipulation and analysis. These links also let you upload highly refined spreadsheets or other information in formats that mainframes will accept.

Database interface links go beyond specific tie-ins to one vendor's application programs. Sometimes they are termed generic because they're capable of reading—or summarizing—data files from different main-



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## LINKS MICRO-TO-MAINFRAME

frame file structures. Many offer simplified commands and two-package solutions.

Database interface links, however, have varying capabilities. One of the most powerful, PC/Focus (Information Builders Inc., New York City) is a database management system, a mainframe-level applications development tool, and a report writer. It lets you write queries to a mainframe and selectively extract data from Focus database files or other database files in the IBM environment. It can also accept database transactions entered and validated locally and then send them to a mainframe for processing. Its data files are structured the same way for both micro and mainframe. You can build databases and other applications on either your micro or a mainframe by using an English-like programming language. PC/Focus's price: less than \$1600 per package. It requires a terminal emulator.

Other link packages in this category work differently. Informatic General's (Canoga Park, CA) Answer series, which includes Visi/Answer, dBASE/Answer, and Lotus/Answer, cooperates with a \$30,000-to-\$45,000 mainframe file extraction package, Answer/DB, that will read virtually any file written in common mainframe file structures. Answer/DB can read files in IBM's IMS, Cullinet Software's ICMS, Cincom Systems' Total, and Software AG's Adabas, for example. The corresponding Answer micro packages let you decide, off-line, which data to look at. You select the conditions, fields, and types of data sorting desired, then send your completed request via Irma or a similar board to the mainframe, where your request is executed. The data is downloaded to your micro in formats that VisiCalc, dBASE II and III, Friday, Framework, 1-2-3, and Symphony can use.

Another link, Cullinet Software's (Westwood, MA) Goldengate package, exemplifies a variation of this strategy. The \$795 package is a stand-alone integrated series of micro applications which, according to its producers, can be equipped with the capability of directly uploading and downloading data from

Cullinet's own mainframe product, the \$150,000 Information Center Management System (ICMS). This package summarizes data on the mainframe and presents it in a format that is understandable to personal computer users who aren't familiar with corporate mainframe language.

Given the proper commands, Cullinet's mainframe package, like some of the more general links, can read databases like IBM's IMS and DL/1, as well as data produced by outside sources. The file summaries are then converted into Cullinet's own database format. This capability, combined with a microcomputer package called InfoLink (an add-on to the Goldengate package), enables micros to exchange files and talk to one another using ICMS as the host. They can also manipulate data downloaded from the host. A still newer capability integrates ICMS with 1-2-3 and Symphony.

### Link Now or Later?

There's so much new technology being developed in the micro-to-mainframe link arena that our functional categories may well be supplanted in the near future. For the micro user of today, the uncertainties of the link marketplace pose some unusual problems. Do you wait or not? Is it better to plunge in and buy a mainframe file-extraction package that costs anywhere from \$30,000 to \$150,000 and also pay hundreds to thousands of dollars for a corresponding micro package, as well as \$750 or more for a terminal emulator? Or do you wait for cheaper and more technologically compatible solutions?

In some cases, you may not have the option of waiting. And in any case, choosing a micro-to-mainframe link is usually a group decision made by managers, technical specialists, and mainframe systems people who know the capabilities of their mainframes and are intent on keeping their corporate data well secured and restricted from as many people as possible, including you.

For now, one of the most reliable micro-to-mainframe links is readily available for most large computers—the asynchronous link. Although

asynch links are relatively slow, some asynchronous mainframe ports can be set to run at speeds up to 9600 baud. Asynch links also let several different types of microcomputers tie readily into a mainframe system. And asynch links often cost less than a leased full-time line for synchronous communications. In fact, if you have comparatively small amounts of data to shuttle back and forth and speed is not of paramount importance, then "talking ASCII" may be ideal.

The synchronous decision, on the other hand, begins to look better when you're talking high-volume traffic and have a great need for high-speed service and networking. In that context, terminal emulators can be adequate. In fact, low-level terminal emulation is the most common method of connecting personal computers to an IBM host. Emulation lets managers and executives maintain off-line processing power and still tie into corporate databases occasionally. And micros are frequently cheaper than dumb terminals.

Many companies, on the other hand, choose the more powerful but more expensive route of application interface links. Some buy a specific link to their own mainframe-resident accounting or budgeting package, then download selected financial information to their micros to prepare summary reports and budgets. Some organizations buy high-level links but restrict uploading of files because they doubt the security of current link products.

### One Final Word

Mainframes and micros may eventually integrate seamlessly with each other. Many vendors are promising that and more. For now, we all need to remember that micro-to-mainframe links are like early versions of the telephone and telegraph. The nitpicking points of operation have yet to be refined, but the systems work and offer immense potential for handling reams of data. With a growing demand for such wonderfully inventive products, it's only a matter of time before the gap between micros and mainframes is closed. □



# Disk incompatability Problem solved!



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The Apple Turnover package consists of a 'half-size' printed circuit card, auxiliary cable, software and user manual.

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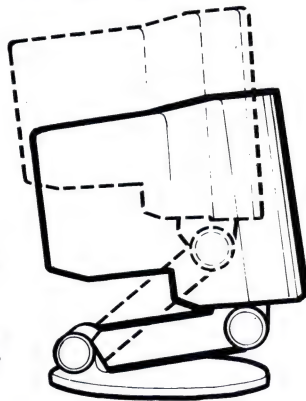
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17-May-85 9:00am		May		Jun	
	Who	Status	17	24	31
Friday	Ma				7 14
Research	Ma				
Interview	Ma				
Develop 1st draft	Ma	C			
Submit 1st Draft	Ma	C			
Edit	Ed	C			

What: [Research] (Fixed Date, ASAP, ALAP, Span)  
 Start Date: [30-Jul-84 9:00am] plus [ 2] (Minutes, Hours, Days, Weeks)  
 End Date: [ 1-Aug-84 9:00am]  
 It is (Future, Started, Done)

Who is needed for this? Choose any of the following:  
 Ma Ed Il Ph Il I2

Notes: [Research Louis Pasteur's application of the scientific  
 revolution to the wine industry.]

Costs: Fixd [ 0] Var [ 0] Al [ 0] Bl [ 0] Cl [ 0] Dl [ 0] El [ 0] Fl [ 6]  
 Priority: (XLow, Low, Med, Hi, UHi) Summarizes other schedule: [ ]

Task Form

# Time Line

*This project manager for the IBM PC  
more than gets the job done*

**P**roject management is the supreme juggling act. Most managers find themselves charged with the often Herculean task of distributing the finite resources (in a business sense) of time, money, and people in a way that gets a job done on time and within budget. Many managers are still working in the past, drawing charts and filling in text by hand.

Project management software can plop these workers into the present and give them the efficiency that comes with embracing a proven technology. Time Line helps you keep track of projects, giving you a means to manipulate tasks and time and cost estimates. Easy to use, Time Line helps you track the accuracy of those estimates and make changes in your plans to reflect changes in the real world.

Like many microcomputer project management programs, Time Line uses both Pert and Gantt charts to illustrate the interdependence of tasks in a project.

Although Time Line depends on graphs and charts to communicate with you, it does not require either a graphics monitor or a graphics

printer. (We reviewed Version 1.1. Version 2.0, available by the time you read this, reflects changes suggested by users in some of the finer points in allocating resources, in costing categories, and multiple schedule management.)

Time Line uses the Critical Path Method for determining the most efficient way to get a job done. The CPM involves monitoring those tasks that must be completed by a certain date to ensure the timely completion of the entire project.

When working with large projects, it is often difficult to tell when an overdue task will result in an overdue project. Time Line, sentry-like, warns of late finishes as soon as the critical path is affected sufficiently to cause project delays. Further, you can highlight the critical path to discern the offending task.

Before you actually begin committing your projects to electronic media, you might consider working your way through the tutorial, which demonstrates the development of a sample project.

Seven easy-to-follow and entertaining sessions put you in the shoes of a vineyard owner and have you try

most of Time Line's commands. An audiotape prompts those who'd rather learn by listening than reading. The tutorial's index is helpful.

Time Line is menu-driven, but you can avoid the menus in some instances by using the function keys to perform 19 of the most common commands (the Alt key is used in conjunction with 9 of the function keys to provide all 19 options). To assist you in remembering the use of these keys, Time Line comes with a Quick Reference Guide that describes the uses of special keys and procedures for performing common tasks. And context-sensitive help is available at any time. Time Line's 166-page manual includes many screen displays and helpful hints.

You create a project management file and interact with the program by entering information in a series of forms, which are, in essence, groups of questions that you answer to describe your projects.

Impressive in terms of numbers, Time Line supports projects with up to 1000 tasks, but for that you need 640K bytes of internal memory. With 256K bytes of memory, you can create projects with about 100 to 150 tasks, and with 512K projects can contain about 700 tasks. You can have 16 resources per project and you can assign all 16 to each task, if needed. Hard-disk owners will see an increase in speed of operation, but tasks are limited by RAM, so 1000 is the limit.

The project-definition form is the first one you meet. With it you name and describe the project and indicate a DOS path name for locating the file on disk. You also specify how many (up to eight) old copies of the project you want to archive on disk. Once these preliminaries are out of the way, you move on to the who, what, when, and where.

With the Task form you give each task a name and specify the estimated duration, personnel resources required, estimated fixed and variable costs, priority, and notes. In addition, you must identify the task type as Fixed Date, ASAP, ALAP, or Span task.

Fixed-date tasks are scheduled according to a starting and an ending date. Time Line will reschedule a



Fixed-date task only if you have not completed a prior task on which the Fixed-date task is dependent or if the resources are not all available.

ASAP tasks will automatically be scheduled and rescheduled to start as soon as any tasks on which they are dependent are complete.

ALAP tasks will automatically be scheduled and rescheduled to start as late as possible before any tasks which are dependent on the ALAP task. If this sounds a little confusing, think of working backward from a set deadline and the uses for ALAP tasks become obvious.

Finally, Span tasks take as much time as they are provided with between the tasks that immediately precede and follow them. Time Line automatically calculates the duration.

The duration of a task can be expressed in minutes, hours, days, or weeks. This duration is used along with calendar information and resource availability, all of which you provide via forms, to determine projected completion dates and amount of slack time. When you need to set a milestone or target date, you simply give a task a zero duration.

You can direct Time Line to schedule tasks based on the availability of resources in addition to critical path concerns. To resolve conflicts between two or more tasks requiring the same resource, you may prioritize each task.

The Task form allows you to define a task as a summary of another project. In effect, a task can call another project that has its own set of tasks. Each summary task can also support 16 resources. And any changes made to the subordinate schedule will be reflected in the master schedule.

The Resources Names form lets you enter up to eight 8-character names that represent personnel resources, either individuals or groups. If you change the name of a resource, all tasks that required that resource will be adjusted to reflect the new name. You can also define a resource as a floater by preceding its name with an asterisk. Floaters, unlike other personnel, may work on more than one task at one time.

The Calendar form allows you to

define the number of hours in a work day and a work week, as well as the days worked or not worked in a given month.

The Report form lets you send reports to the printer, a disk file, or the screen. If you choose to send a report to a disk file, you have the option of formatting the file for use with WordStar, Volkswriter, XyWrite II Plus, EasyWriter II, or ASCII files without control characters.

The Partial-join form lets you overlap dependent tasks or add extra time between two dependent tasks.

The Cost form supports eight costing categories for each task. Among the options are the timing for accruals (all at end, all at start, or prorated over time) and the calculations for fixed, variable, and miscellaneous resource costs.

#### AT A GLANCE

### Time Line

#### Manufacturer

Breakthrough Software Corp.  
505 San Marin Dr.  
Novato, CA 94947  
(415) 898-1919

#### Price and Hardware Requirements

\$395; IBM PC or 100% compatible with 256K bytes of RAM, and either two floppy-disk drives, or one drive and hard disk; color or monochrome display; parallel printer

#### Reviewer's Note

Exceptionally easy to use, Time Line is ideal for general business projects, as opposed to large construction projects.

*Distributed in Australia by PC Extras — A\$670 for Version 2.0.*

The Gantt chart is your main link to the program. With this chart Time Line graphically displays which tasks have some slack in their schedule, which tasks are critical, which tasks are to be performed in parallel, and which tasks are late. The character graphics used to construct the chart include triangles to mark milestones, underlines to illustrate slack times, and bars to illustrate task durations.

You can control several options for displaying the Gantt chart, including

the scale to be used, the amount of space to be used by descriptions and graphs, and which tasks are displayed. This last option is very important because it allows you to highlight or display only those tasks that meet your criteria. Criteria can be based on slack time, start and/or end dates, resources used, and relationships to other tasks. To pick a complex example, you could choose to display only those tasks for which you are personally responsible, that have no slack time, and which start this month.

When working with the Gantt chart you can access the Pert chart with one keystroke. While the Gantt chart consists of horizontal bars using different shapes to reflect the status of each task, the Pert chart consists of boxes connected by lines. Each box represents a task, and each connecting line illustrates the relationship between the tasks.

Although the Gantt chart is the backbone of the program, the Pert chart is useful for providing an alternate view of your project. You can view the entire chart and its related tasks or only those tasks that you choose to display, either on-screen or printed. Further, the Pert chart is automatically updated whenever the Gantt chart is updated. You may also modify the Pert chart directly.

Time Line's Report menu lets you print Pert charts, Gantt charts, Cost reports, Status reports, and task Detail reports.

If you manage projects, or manage someone who does, Time Line can be a helpful tool in making projections and tracking performance. Most important, by quickly highlighting trouble spots, Time Line can give you the advance warning you need to acquire more resources, reschedule current resources, or alert superiors or clients that a project is in trouble. In the business world of limited resources where everything means money, Time Line will help you keep vigilant watch over project progress to ensure that you make your deadline within your budget.

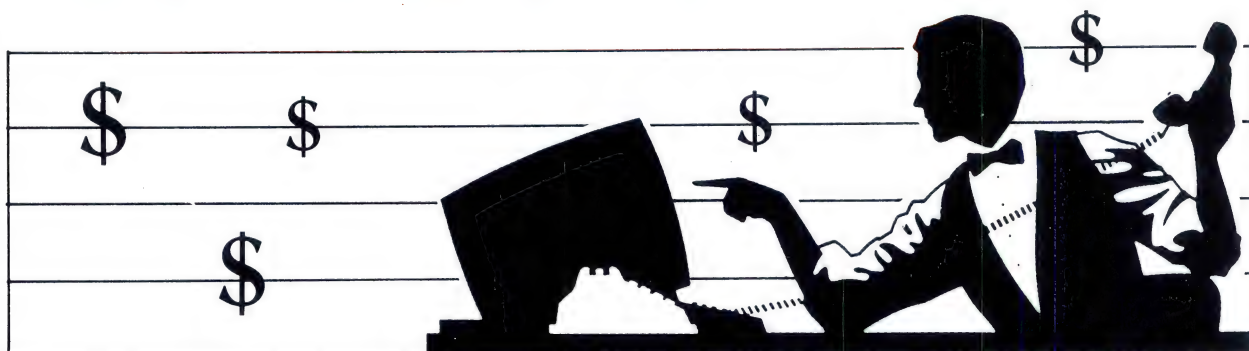
—GEORGE F. GOLEY IV

George F. Goley IV is president of Micro Endeavors Inc., a New Jersey-based microcomputer consulting and programming firm.



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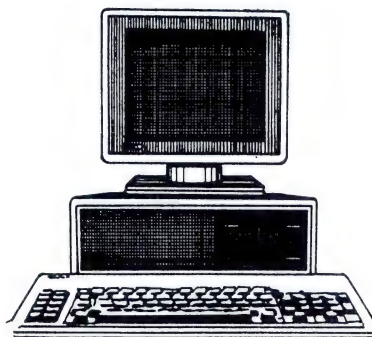
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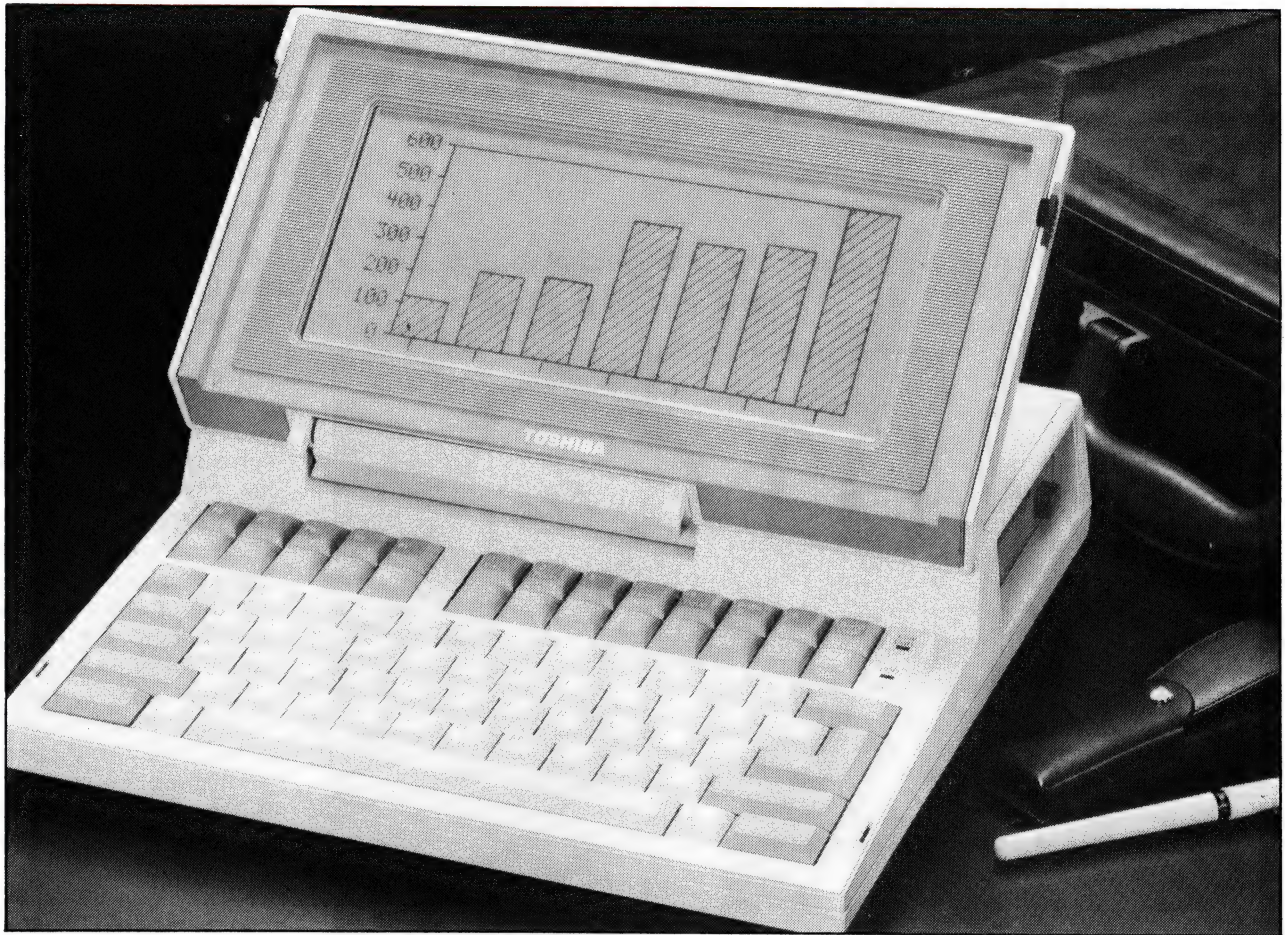
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SOFTWARE COMPUTERS



# When Less Is More

**A** year ago, the hottest trend in software publishing was integrated software. After Lotus Development Corp.'s phenomenal success with 1-2-3, it seemed as though software experts were betting that the big successes in the future would be expensive programs that combined all or most of the major applications of personal computers—word processing, financial modeling, file management, graphics, and communications.

You remember those days. We were all convinced that Lotus's Symphony, Ashton-Tate's Framework, or yes, even Ovation, was going to set the world on fire. It didn't happen. Symphony and Framework have sold a fair number of copies, but they sure didn't make anyone forget their manufacturers' earlier products. And Ovation never materialized.

The most popular integrated software package is none of the above; it's Appleworks, a very different type of program that combines limited-function word-processing, spreadsheet, and file management applications. So what happened? And what does this mean for software in the future?

## Levels of Integration

First we need to define what we mean by integrated software, a term that has been used to cover many kinds of programs. On one end, we have *families* of programs created by the same vendor that share similar commands and are designed

*Are integrated packages too big  
for their own good?*



to exchange information with one another. Many companies have tried this route, though only two firms (Software Publishing and Microsoft) have been successful with business programs for microcomputers.

On the other end, we have *integrating environments*, which don't do anything in themselves, but rather let you run several programs at the same time in different windows while passing data back and forth. No integrating environment has yet taken off for the IBM PC or similar machines, though IBM's Topview, Microsoft Windows, and Digital Research's GEM still have a chance; such an environment is part of Apple's Macintosh, however, and is clearly a success.

But most of the attention has gone to *multiple-function programs*, software that combines several applications. This category was initially defined by 1-2-3, which combines spreadsheet, graphics, and list management features. More recent examples include Framework and Symphony, both of which contain word-processing, spreadsheet, list management, graphics, and communications functions. Though market analysts initially viewed these programs with great expectations, at least in the IBM PC world, they have not sold very well.

## 1-2-3's Success

But wait, you say. Isn't the most popular program for the IBM PC an integrated program? In fact, it's a multiple-function program: 1-2-3.

Well, 1-2-3 is undeniably a huge success; but perhaps that just points out the flaws in the definition. I'd argue that 1-2-3 is not integrated software in the same sense as Symphony or Framework; rather it's simply the world's most popular spreadsheet program (and isn't that enough?). Instead of trying to be all things to all people, it concentrates on providing specific help for people who spend most of their time building and analyzing financial models.

From this perspective, 1-2-3's ability to turn spreadsheets into charts doesn't make it a program for creating presentation graphics; it is still primarily an analytical tool. Similar-

Michael J. Miller is a West Coast editor of *Popular Computing*.

ILLUSTRATION BY TIM GABOR



ly, list management functions such as searching and sorting can be used for analysis of financial models, not just for traditional file management applications. Lotus's 1-2-3 may have been used to define multiple-function programs way back when, but now we can see that its real success has been as a spreadsheet with a lot of additional features.

### **Tightly Integrated Packages**

Looked at this way, 1-2-3 simply gives financial users extra functions like sorting, searching, and producing graphs in the same way that programs like Wordstar Professional add mail merging and spelling functions to the traditional text-editing and document-formatting features. Though nobody considers such word-processing packages integrated software, they also combine features. Both the word-processing packages and 1-2-3 are examples of tightly integrated packages aimed, respectively, at two specific groups—people who produce documents and people who work with figures.

I'm convinced that the great majority of computer users spend most of their time with one major application—be it a word processor, spreadsheet, database, or something more exotic. Most users do not need all the functions of the big integrated programs, and they certainly do not want to sacrifice the functionality of their primary application. Besides, they don't need the bother of learning to use an extremely complicated program.

These people may still want some of the functions found in other types of programs, however. For instance, 1-2-3 users may need a notepad to scribble down some text, and Wordstar users might want a calculator to add up a few numbers every now and then.

### **Desk Accessories**

Such users may find a solution in desk accessory software, those programs that remain in the background while you run other programs but appear at the top of your screen at the touch of a button.

Indeed, desk accessory programs such as Sidekick from Borland International (Scotts Valley, California),

Spotlight from Software Arts (Wellesley, Massachusetts), and Pop-ups (also marketed as Deskset Plus) from BelleSoft (Bellevue, Washington) have been the unexpected software successes of the year. Such programs give you small applications—things like calculators, notepads, and appointment calendars. In fact, they are very similar to the desk ac-

**THE GREAT  
majority of users  
do not need all the  
power and multiple  
functions of the  
expensive and much-  
hyped integrated  
software packages.**

cessory concept used by the Macintosh. They are easy to use and relatively inexpensive, costing from \$55 to \$130, compared to \$500 or more for the most complex integrated packages.

To some extent these programs came as a surprise. Not the well-advertised and highly promoted products from bigger firms, they came instead from smaller firms with much less promotion money.

These programs offer a little bit of each type of the major applications—such as a notebook instead of a full-scale word processor, a name and address file instead of a complete file management program, or a calculator instead of a spreadsheet. But their capabilities are growing. For instance, T/Maker Corp. (Mountain View, California) already offers Click On Worksheet, a Macintosh accessory that gives you a small, 20-column by 50-row spreadsheet.

Just by covering the basics, these limited programs may lure many users away from the big integrated programs. And because they usually include some of the features of a clipboard to move information between applications, they may also end up competing with the integrating en-

vironments such as Topview, GEM, and Microsoft Windows.

### **Appleworks**

Single powerful applications combined with desk accessories may indeed take the place of integrated software for all but the most sophisticated users, whom the industry now insists on calling "power users."

But what then explains the success of Appleworks? This combination of word-processing, spreadsheet, and file management functions was, in fact, the single biggest-selling computer program last Christmas. In part, that's because the program has the Apple name going for it, along with the firm's considerable marketing clout. But unlike the big integrated packages, Appleworks does not try to be a full-function solution in each of its applications. All three applications are more limited in Appleworks than they are in stand-alone programs.

So instead of going to either the power users or the mainstreamers who have one primary application need, Appleworks appeals to users who want to do a little of everything. That may encompass many people, but it does not make up the large business market that integrated programs were supposedly aimed at.

### **What We Need**

As it stands, we have not one type of multiple-function program but several, and each is for a different audience.

The well-advertised, well-known integrated software packages like Framework and Symphony are for people who need full-function applications in several areas. The less versatile programs, such as Appleworks, are better suited for people who do a little of everything but not much of any single application.

For the rest of us, the great middle class of computer users, neither of these approaches is appropriate. What we need are exceptional programs in our particular application plus a little bit of the other functions. Thus tightly integrated programs along with desk accessories may be a better solution.

Now all we have to do is convince the software developers. □



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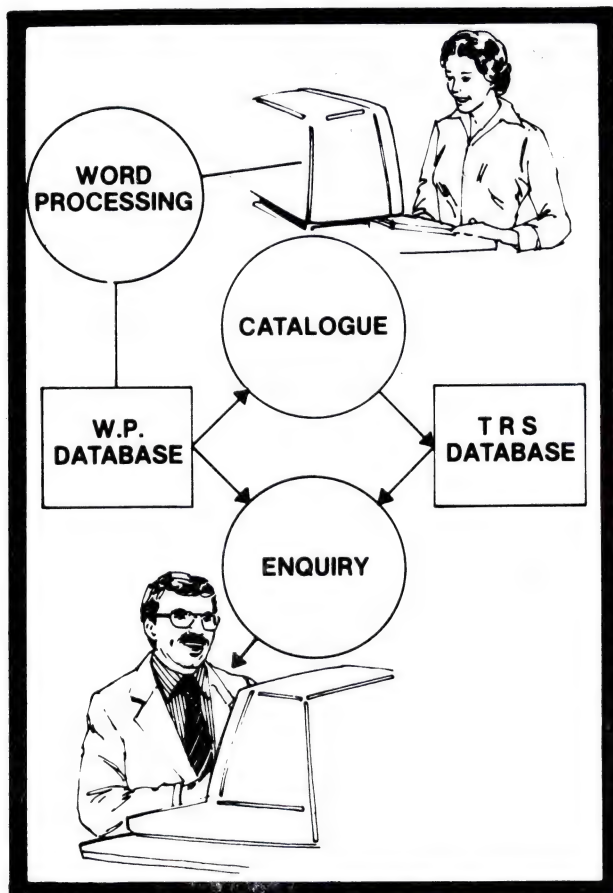
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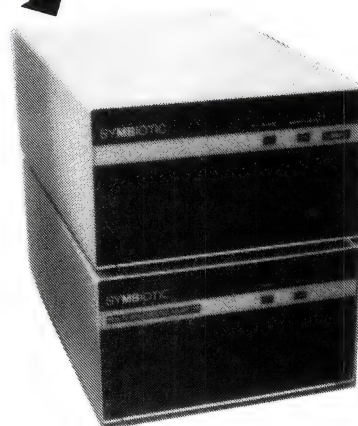
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# A High-Tech Education

**E**very year we hear the breathless announcement: computers will revolutionize education, and this may be the year. So far it hasn't happened, but it's inevitable. Computers will change education at least as profoundly as did Gutenberg's movable type, and although it will take a decade or more before the educational establishment iceberg really changes, the capabilities are likely to come to us in a rush. Parents and nonestablishment educational institutions can make effective use of computers in education long before the public schools can respond. The trick is to keep track of what's going on so you can be prepared.

Schools have a problem: what do you use computers for? Are they more useful in lower grades to teach reading or in higher grades? These are questions that won't go away because equipping classrooms with computers is expensive. Most schools have one or two machines, generally donated Apple IIs and sometimes Tandy machines. Few school boards have enough money to allow every student, or every other student, to have one. Even if the machines were widespread, they'd have to be linked together for effective classroom use—but networking hardware isn't cheap either, and the software to link machines in an educational setting is more promise than reality.

Then there are the conflicts among

*Computers can play a vital role  
but parents may have to get involved*



schools boards, administrators, and teachers. "We have a deal, just for you," the salesman says. "Because we like the El Wunderland School District so much, we're going to let you have 500 Texas Instruments 16-bit computers for only \$99 each!" After which the teacher has to find someone to tell her that the TI may be well designed, but it has been abandoned by its maker and no one is writing software for it any longer, get the administrators to understand that, and then convince the school board that it might be better to spend more money for fewer but more current machines.

In fact, the major value of using

computers in education may be to allow education officialdom—administrators and professors alike—a face-saving way to retreat from the dead end that they have led us into. For 40 years and more the emphasis on education theory has not been to achieve results but to excuse failure.

Case in point: you need not teach a child to read if you can show that the child "has" dyslexia. Of course it's a self-fulfilling prophecy: a kid who has dyslexia can't possibly learn to read, therefore no one tries to teach him. The tragedy is that real dyslexia—an actual inability to learn to read—is extremely rare. Reading specialists who see only problem readers may encounter such a pupil once in an entire career. Clearly the diagnosis is more common

than the ailment.

Once a child has been diagnosed as "having" dyslexia, the school's incentive structure is reversed. Now if the child learns to read, the school must admit that the diagnosis was in error. Few educators want to make such an admission. Under the present system there's little danger that they'll have to.

Computers can change the whole situation. Computers are new. They can work miracles. Where miracles are expected, miracles are common. I predict that the instant that we

Science fiction writer Jerry Pournelle, who joined the micro revolution eight years ago, is a contributing editor of *Popular Computing*.



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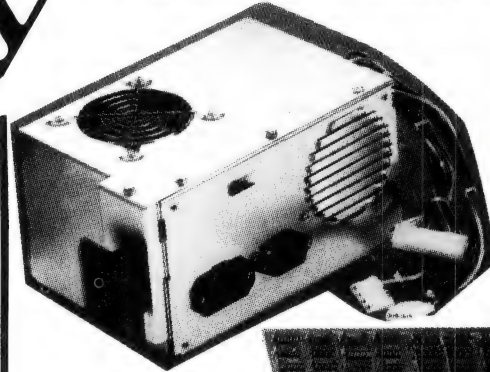
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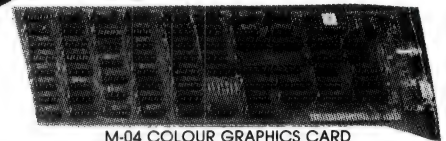
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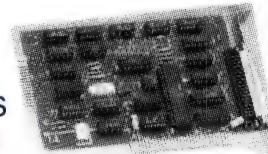


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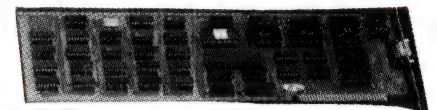
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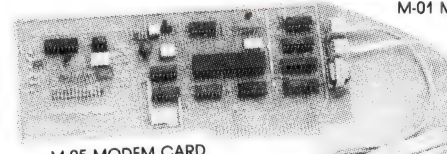


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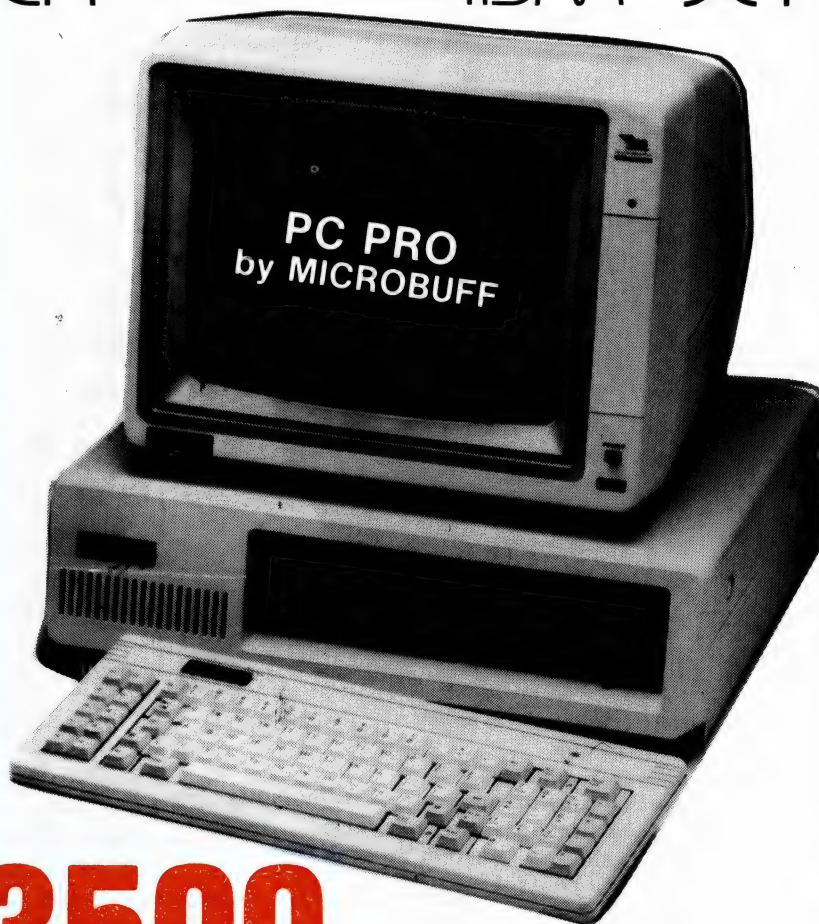
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convince principals and other school officials that computers can deal with dyslexia, lots of dyslexic kids will suddenly learn to read.

Besides "curing" dyslexia, using computers to teach reading in elementary schools can benefit lots of students. But there's a problem with this: if the students can't read, how do they learn what the computer wants them to do? The obvious answer to that is voice synthesizers, but so far I haven't found a combination of synthesizer box and speech software that I think acceptable. All the "educational" talking computers I have heard sound like machines and inspire the children to laughter or boredom. It's clear that good speech synthesizer chips exist. My Chrysler automobile has a speech system built around TI's chip, and while some of the computer's messages may be a bit odd—"A door is a jar" is one of the strangest—the car doesn't sound like a machine at all. It speaks with good clarity and diction.

So far, though, no one has built a reading program around the TI chip. The best speech system I have heard so far is one for the Apple IIe and IBM PC developed by Steve Ciarcia. There is also a program known as Smooth Talker for the Macintosh. The Macintosh has a "four-voice" speaker system built into its operating system; Smooth Talker makes use of that. It doesn't sound as good as my car does, but it's a lot better than many of the others. The drawback here is that while the Macintosh is easy to use, it isn't cheap, and there aren't a lot of them in elementary classrooms.

### Alternatives

Until good speech synthesizers are widespread, as a practical matter, there are only three ways to use the computer to teach reading: employ a human reader to translate what's on the screen to speech, use the computer as a word processor, or use the computer to control a tape recorder.

Roberta Pournelle's reading instruction program uses a human: parent, sibling, tutor, grandparent,

neighbor, or indeed anyone who can read and is interested in teaching others. The computer then serves as a device to teach the "teacher" how to teach reading. The program sees that the "teacher" doesn't skip valuable lessons, gets the lessons in the proper order, and doesn't get bored. It also keeps track of the student's progress.

---

**T**EACHING  
children to read  
with the aid of  
a computer can  
be done by  
parents and siblings  
as well as by  
classroom teachers.

---

I'm told that at least a dozen such programs are in the works. Of course, few school districts can afford that kind of individualized instruction. On the other hand, parents often can.

Another approach that's often recommended is simply to use the computer as a word processor: the student dictates a story, the teacher transcribes it on the computer, and then the story is printed. This is said to give the students tremendous motivation to learn how to read "their" stories. It probably does that, and in the absence of a more structured reading instruction program, it may be something parents should do; but whether this is a good way for teachers to spend their time is open to debate.

Yet another recommended approach is to have the computer control a tape recorder. This has obvious drawbacks. While you can program a tape recorder to read lists of words, it's very hard to get it to loop back to a precise point. Setting up a program to "run" a real lesson turns out to be fairly complex. If students always got the same items

right—or wrong—then the spoken part of the lesson could be simply repeated on the tape. But fate arranges that pupils are never consistent. The result is an individualized program for each student, and that doesn't save very much time for the teacher.

One of the best ways to keep up with new developments in this area is through conferences. Among the best I've found are the conferences on Computers and Reading/Learning Difficulties put on by Gerry and Carol Block since early 1983. They have them on both the east and the west coasts, and now they're planning to add Chicago to their circuit. The Blocks also publish a journal, CRLA (Computers, Reading and Language Arts; 1070 Crows Nest Way, Richmond, CA 94803) which is well worth reading by anyone interested in the subject.

There still aren't many practical systems making effective use of microcomputers for education, but we're building a solid body of theory.

### Creativity Software

A lot of software probably does something educational, but no one can figure out what. This stuff is usually called "creativity software." The theory is that the kid plays with it and the creative juices flow automatically. The imagination is stretched. New worlds are opened.

In my day we called that "reading books."

This isn't to say that some of the creativity software isn't useful. (The computer does let you experiment with real-life situations that are simply too messy or too complex without the use of simulation.) Anything that will lure children away from the horrors of TV—whether MTV or those ghastly afternoon cartoon programs—is likely to be useful. Indeed some creativity software is superb. For example:

The Factory, from Sunburst Communications (39 Washington Ave, Pleasantville, NY 10570) is a computer game that teaches quite a lot about spatial relationships and cause and effect. The game is quite simple: one student designs a series of ma-



chines that can bore holes, paint stripes, and rotate a sheet of plastic. Then a sheet of raw material is sent through the factory. A shape emerges. Other players then try to design machines that will duplicate the final product. The game is fun enough that it had me playing.

Another, for somewhat older children, is *The Robot Factory* from The Learning Company (545 Middlefield Rd., Menlo Park, CA 94025). This program allows you to design robots. The robots can have bumpers, thrusters to move them, eyes to see with, grabbers to grip with, batteries to power themselves, and a whole host of other attributes. The player installs parts, wires them up in complex circuit diagrams, and applies power. (It all happens on-screen: there are no moving parts.) The object is to design a robot that can get out of a maze by itself.

If you get bored with simple robot designs, you can build up robot brains in computer chips and install those into robots.

The result is a game that's fun while teaching a whole raft of high-technology concepts. I can't imagine kids not being better off for having mastered this computer game.

The *Factory* and *The Robot Factory* are excellent examples of things you can't do without computers—of an entirely new kind of game that simply wasn't conceivable before the computer revolution.

### **The Revolution Continues**

Computers will change education needs faster than even the best educational institutions can keep up.

The printing press fundamentally changed education. Prior to Gutenberg the primary teaching device was the lecture. "Lecture" comes from the word meaning to read, and no wonder: in the original "lecture" a graduate student read from a rare book, and the undergraduates frantically took notes because it was certain that they would never be allowed actually to have a copy of that book.

Cheap books of good quality made the traditional lecture obsolete. Today's students shouldn't have to lis-

ten to lectures unless the professor is inspiring. There are better ways to teach and good schools know it.

The computer will have that kind of impact on education. Up to now we have greatly prized the ability to memorize facts. Even after Gutenberg made it simple to keep most facts in long-term slow-access memory (books) we generally tend-

---

**WE HAVE**  
**always given high**  
**marks to students**  
**who could memorize**  
**masses of facts,**  
**but the computer**  
**revolution will**  
**change all that.**

---

ed to give high academic awards to those who could fill their short-term rapid-access memory (brains) with facts. The best example is probably the spelling bee.

I would think that as the computer revolution proceeds, rote memory will be less prized. After all, I already have a spelling program that will outperform just about any national spelling bee champion.

### **Accessing Data**

Scholastic, a major textbook and educational software publisher, is putting together large databases of materials on such subjects as history. According to Dr. Walter Koetke, Scholastic's director of technology, students can go spelunking through that database, framing and testing hypotheses, and learning history while also "learning the absolutely vital skill of using databases."

He's right, of course. In the near future anyone who can't retrieve complex reports from a database will be as handicapped as an illiterate was 30 years ago.

The rest of the theory can be

challenged. After all, we were able to frame and test hypotheses when I was in sixth grade. It was called "writing a term paper" and the database that we learned to use was the public library.

I suppose Scholastic would love the idea that the kids learn that all of the facts are resident on Scholastic Inc. disks, but with all due respect, I wonder if it's true. I'm sure the authors of those databases have tried to get everything right, but suppose they missed something. I presume that compilers of databases will try to get "just the facts," but what are those facts? I guarantee you that the facts we Tennessee kids learned about the War between the States were quite different from what students in Iowa got about the Civil War.

Perhaps it doesn't matter. Within a few years we will all—students and adults alike—have access to enormous databases. New technology allows us economically to "read" books into computers in the same way and about as easily as we make photocopies of their pages. Once the text is machine-readable, it's no great trick to write programs to precis it. True, the abstracts will to a great extent betray the prejudices of those who wrote the precis program, but others will have their whacks as well. I can foresee a time when a good Master of Arts thesis might be to make a new database "interpretation" of a classic work such as *Federalist* #10.

The point here is that computers, by doing things differently, can vastly change people's lives. Parents who realize this and pay attention can give their children a priceless head start. If they want to help their children get along in this world, they would do well to invest in a computer: but they ought to be very selective about the software, and they shouldn't neglect books and libraries. And perhaps this time when the explosion comes, we'll be ready for it. □

Jerry Pournelle welcomes comments from members of the micro revolution. Write to him c/o Popular Computing, POB 397, Hancock, NH 03449. Jerry tries to answer all his mail but cannot promise individual replies.



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# Selecting the best Business Computer

By WILLIAM NITSCHKE

---

Which is the best computer to buy? The very idea of "best" is a subjective one, waiting to start arguments. How do we go about defining "best"? Is it the computer that has the highest graphics resolution, the most memory and the fastest operating speed? The one that has the most software? The one that offers the greatest value for money, given its computing power? Or are other considerations more important? What of compatibility, quality, support and reliability? Computer buying is a tricky business, but there are ways to tread carefully.

Most users favour their own system and recommend that. In my case, this is a little bit more complicated because I own or use an Apple III, Zenith Z-150 desk-top, Zenith Z-160 portable, TRS-80, MPF-III 327, Commodore 64, Comex PC, and Comex Apple compatibles, as well as having daily access to Macintoshes and other notables. But I don't like to think of myself as a fanatical computer hacker concerned with the obscure intricacies of each: I also have to teach absolute beginners how to use these devices, making me concerned about ease of use.

It is my business to recommend computers to people, six days a week. I've found so far that people don't fall into simple categories, nor can I recommend any single computer to suit everyone. But by following a few basic principles, and by learning what really is and isn't important in computer selection, computer buying pains are eased.

## Software or Hardware?

Any "Guide to Selecting a Computer System" will tell you that software is the key. You don't buy a computer and *then* look for a program — you buy a package. But the hardware — the computer and its accessories — plays an important part in determining what the software is ultimately capable of doing. Both factors have to be weighed equally, so both will be discussed in turn.

Most computer purchases are subjective rather than objective. That is,

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*William Nitschke is Director, Sales & Technical Support, Computer Haven, 183 Maroubra Road, Maroubra, N.S.W.*

sales are often decided by the look of the machine, or the impressions left after the sales talk. This is good in that you are seeking something that looks professional and you want it to be sold to you by professionals. Yet this is as far as the importance of appearance goes. Avoid being beguiled by a salesman willing to tell you anything, so long as he moves stock. Likewise, another apparent lifesaver, yet an actual bane, is the colleague who already owns a computer. Seek his advice and determine if he can tell you whether the job you want done can be done well by a computer, but resist his choice of system for you. There is only one person who can do that.

If you are able to put your reasoning above your emotional self, what should determine your decision? Selection criteria vary depending on whether you are looking for something for your business or profession, for your family, or for yourself. In a business situation, your major concerns, in order of importance, are: the program you are mainly buying the computer for, the operating system or standard, whom



you buy it from and what service they will offer, indications of reliability, the price, and future capacity. For you and your family the main factors are: the operating system or standard, and then the price.

Home users who want a video game/entertainment machine with some facilities for education need only a toy, such as a Commodore 64 or similar. Beyond a certain point, they are limited in what they can be made to do. If you are looking to use it to run your business, or just do a bit of word processing, then they are definitely *not* worth considering. They can be made to do things that they were not meant to do, but this can be unnecessarily expensive and messy. A small computer that can be considered something more than a games-only machine has the eventual capacity to support a software standard called CP/M. More on this later.

It is worthwhile adding that it is not essential for the system to have more than "8-bit" performance, a silly notion given life by trendies, who insist that all must be dipped over the leading edge of technology. In a business situation, an 8-bit machine may or may not be suitable, but for home use there are virtually no disadvantages. You don't need 256K of memory for straightforward word processing, and definitely not for games or education.

For business, your decisions become crucial. Start by defining exactly what you want your computer to do and when it comes time, outline this on paper and present it to the salesman. Ideas in writing will incline him to believe that you are motivated by need, not curiosity.

### Three Types of Software

Determine if you are seeking something off the shelf, such as a word processor, or if you are specifically looking for something that will automate, say, your restaurant. The first type of program, lumped with spreadsheeting, business graphics and card filing, is known as productivity software. That is, it takes the tedium out of repetitious tasks such as writing late-account letters, or

looking up client details. The second type is called vertical market software. It is geared towards performing a particular set of tasks in a specific type of business.

A word processor lets you write on to "electronic paper" — the screen of a video display. Since nothing is fixed inside a computer's memory, you can rearrange words and sentences, insert standard paragraphs at the press of a few keys, and create your very own junk mail. When you're satisfied, then you print it out in fixed form on paper.

Imagine a calculator with an LCD display the size of a table. Imagine, also, that you can enter numbers into any part of this sheet and that you can specify which sets of numbers are to be added, subtracted, multiplied, divided, and so on. What you have is a spreadsheet. It can be used to calculate the cost of a loan, or determine why you aren't making as much on your taxi service as you did last year; but, best of all, it lets you experiment, e.g., what would happen if interest rates went up one per cent? or, in a taxi and petrol business, if you were to start cutting down on taxi operations in order to invest more on the petrol side, say \$5,000 or \$10,000, you would only need to type in a few figures and the computer would recalculate all the profits and losses for you.

Business graphics lets you plot figures from a spreadsheet or some other source, to generate pie charts, bar graphs or whatever is more appropriate, so that you can more easily locate trends and patterns — perhaps correlate them with the months of the year to determine the best periods to stock up. Potential uses are unlimited.

Card filing does what it suggests. It lets you organise and sort any kind of information that can be kept on the surface of a card; such as product information for stock control. A close analogy is a filing cabinet; but one that finds the files for you, given the least details.

Do you want something that will assist you in running your business more efficiently or more professional-

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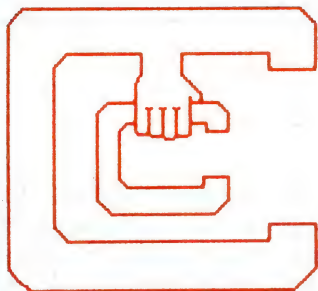
**To minimize the danger, a service guaranteeing 48 hour repair in case of trouble is an absolute must.**

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ly, or do you want something to assist you in doing a specific thing, such as working out quotations? This second need could be catered for by use of vertical market software, which highlights a second factor that becomes vital: reliability. If your computer stops, more often than not, your business stops, because you have all your important records stored inside it. To minimize this danger, a service contract guaranteeing 48 hour repair in case of trouble is an absolute must. Such an agreement usually goes for 10 per cent of the total cost of the hardware per year, and covers the printer, disk drives and other components. Service and repair should be on-site, and labour and parts supplied without additional expense. Note that this is separate from a warranty, which only promises eventual free repair for a limited period of time. Avoid computers that do not have this important option.

Finally, a third type of special software — as difficult to use as it sounds — is known either as a fourth generation programming language, or a relational or hierarchical database manager. (Don't repeat this to a salesman, he might think you're one of *those* jargon-brained customers, and go pale). It sits uncomfortably between general productivity software and vertical market applications. Notable names include dBASE II and III, Condor, Rbase and Meta4, all database programs, or programming languages to be more correct, that have the potential to run a medical practice or a bakery, provided someone programs them. You could do it





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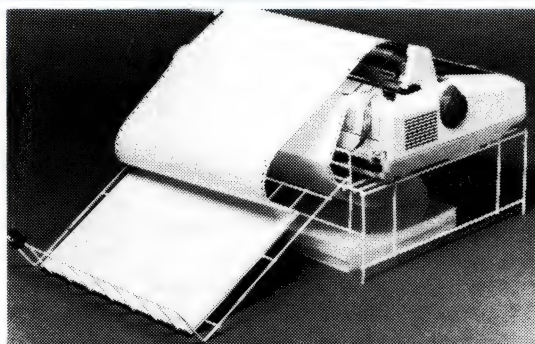
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## This "bits" business, however, is no indicator of power or performance.

yourself, if you had a lot of time, inclination and patience, but otherwise you will have to find a programmer and take his fees into consideration when estimating expected costs. The store from which you intend buying your computer should be willing to do this, or recommend someone who will, if it is their intention to sell you such a program in the first place. Otherwise, don't accept such a computer package as any kind of a solution, unless you want to retire from your business and become a programmer.

### This Bits Business

Before continuing with the discussion on the various merits and minuses of each type of software, it is necessary to put the machines that they run on into perspective. There are several software and hardware paths you can take, from mundanely practical 8-bit systems, right up to 32-bit "super-micros". As the market now stands, the largest include CP/M and Apple II industry standards in the 8-bit arena, MS-DOS and PC-DOS in the 16-bit world, and, probably, eventually, Macintosh in 32-bits. This "bits" business, however, is no indicator of power or performance. In many respects it's even a bit farcical. I recall that when the IBM first appeared, those who knew a reasonable amount about computer architecture described it as an 8-bit computer with "some 16-bit addressing capabilities". Machines before the Macintosh, that were internally similar, were less excitingly called 16-biters, even though Apple has always promoted their machine as having 32-bit power. (The logic here has been that if IBM can promote their not-quite 16-bit

machine as a 16-bit machine, then Apple can push their 16-bit machine as something more).

Let's unravel the sales hype and jargon and look at exactly what bigger bits mean. The type of computer, 8 or 16-bits, is determined by the most important integrated circuit in the system called the microprocessor. A 16-bit microprocessor, as opposed to an 8-bit one, promises two advantages: higher speed and greater internal memory. We'll see if these promises are fulfilled, and if so, measure their relevance.

An 8-bit computer has the capacity to store 65536 separate units of information — each unit being a letter, or digit, or punctuation symbol, etc. This is called a byte. What you have read so far in this article would require about 10500 bytes of storage were it kept in a computer. A kilobyte or a K is approximately made up of 1000 bytes. An 8-bit computer can, therefore, roughly store 65.5K (although in the name of universal consistency, amounts of memory are rounded off until they match a power of 2, thus 64K). A computer running CP/M could work comfortably with 64K.

Such computers are theoretically the slowest because of their smaller size, but in reality they have been around for a sufficient period to allow for improvements and refinements on their basic design. For example, the Z80 microprocessor — the one required for use with CP/M software — is now available running at several times its originally rated speed.

An 8/16-bit computer has the ability to work with larger amounts of memory. The usual maximum amount is 640K on machines like the Zenith and IBM, and those designed along similar lines. Some software uses this extra memory; a lot of programs wouldn't know what to do with half of it. The microprocessor used in these machines is the 8088. It is reasonably fast, but cannot compare with a high performance 8-bit microprocessor, or some of the later 16-bit microprocessors.

A true 16-bit computer, which

salespersons will call 32-biters, has the capacity to work with thousands of K, although about 1000K, or a megabyte, is the usual maximum on offer, since larger amounts start getting ridiculous. Big names in microprocessors include the 68000 as used by the Macintosh, and the 80186 as used in the Tandy 2000. In speed contests, these chips are fast.

Now for exceptions to the rules. It became apparent to 8-bit manufacturers that a limit of 64K did restrict certain types of software from being developed on their machines. Software incidentally, that was becoming very popular. So companies like Apple increased the memory capabilities of some of their 8-bit machines, such as the Apple IIc and the now defunct Apple III, by adding a second 64K block — bringing the total up to 128K — by a technique known as bank switching.

This process is invisible to the user, although unlike 8/16 bit machines, not all software will recognise extra memory. A program written in a 64K environment will still use only 64K regardless of the actual memory in the machine. This was also true of some early IBM software.

256K isn't much, is it? I was once asked. Isn't much for what? I replied. High speed and consumptuous amounts of memory can either be advantageous, overkill, or irrelevant. Consider programs that use virtual memory, a programming technique that treats disk space as if it were internal memory. This means that a system that supports a 360K disk drive is capable of working with programs and data that are 360K in length, even if the system has only 128K internally. A disadvantage is that virtual memory can slow the system down — depending on what you're doing — to an annoying degree, especially when a full 360K is in use.

The processing speed of a computer is usually rated in megahertz (MHz), but as an indicator of performance, this number is misleading. The Apple II family is rated at 1 MHz, a typical CP/M system at 4 MHz, a PC-DOS



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machine at 4 MHz, and some 16-bit computers at 10 MHz. All these numbers are meaningless because each system uses a different microprocessor and it is not possible to make across-the-board comparisons. It's not even possible to compare one 8-bit microprocessor to another, although you can approximately estimate which will be faster, provided that there is a significant difference between the two numbers. You can, however, use it as an indicator if you are comparing two systems that use the same microprocessor. But note that you are only comparing one aspect of the computer. What about the speed of the disk drives? Video displays that are "bit mapped", like the Macintosh's, require extra processing to achieve the impressive graphics you see. This slows things down as well, not to mention all the other hardware/software idiosyncrasies peculiar to each system. In other words, you can't evaluate a system by comparing the raw data found on the back of a sales brochure.

## CP/M Software

Each hardware system must have its own software. CP/M is one such and it is used to describe a particular type of computer that can use a particular type of software. Most CP/M software will run on most CP/M computers, provided you have enough memory. A plus for using CP/M is that you can take advantage of powerful software like WordStar, SuperCalc and dBase II. Moreover, it is possible to obtain further information on these products — usually needed in view of the limits of instruction manuals — through books written to unravel them. A potential problem with CP/M is that while the software is standard, the devices used to load them in, the disk drives, are not. An Apple CP/M disk will not be understood by a TRS-80 or Osborne. If you are evaluating a CP/M system, ensure that it doesn't use an obscure disk format that makes it difficult to locate software.

CP/M was never meant to be what

it is today. It was a program written to organise information on disks, but since there was very little software available when CP/M was around, it became popular. It is also an "operating system" that has its limitations, like clumsy screen handling and unforgiveness. To elaborate, there are two different ways of displaying information on a video display, viz., through its "operating system", or directly. When one goes through an operating system, things start getting slower and sophisticated graphics are ruled out. Screen handling becomes reminiscent of a terminal display as output by a mainframe, i.e., not very good. Direct video access means that information can be moved to the screen instantly, and that colour and high resolution graphics are possible. (To determine whether a system uses one or the other, find out if it is capable of playing a video game along the lines of Space Invaders. A system that can handle such a task employs direct access).

The second problem is that if a disk error is encountered, the entire system "crashes" by not responding to your commands, at least until you turn the computer off and on again. This insolence could take several hours of your work with it.

These problems are solvable. A CP/M computer running at a good speed, say between 4-6 MHz, eliminates the bother of slow video display handling, and later versions of CP/M, such as CP/M Plus, may have corrected some of the other problems mentioned. I can't say, because I haven't had the opportunity to test these later versions.

This all sounds as if I'm very negative towards CP/M, which is not true. I just don't regard it as an ideal environment. There is a lot of good software available, many systems that run it can cost under A\$2000, and it is a viable machine for all sorts of applications from spreadsheeting to word processing. There is a good bit of vertical market software and I also have a deep respect for the Z80 microprocessor, a very powerful 8-bit chip.

You might ask, why spend A\$7000 on an IBM? In view of CP/M, a positive answer could be hard to justify.

## Apple Software

One plus for the Apple IIe is that it can be upgraded to incorporate CP/M, not to mention its own software. The marketing strategy, until recently, has been to keep a basic Apple system simple and let the owner incorporate new features as the need arises. This could be a printer interface, a necessary middle component that allows for communications between computer and printer; an 80-column card, which gives half size characters — really essential for word processing, and memory expansion options. When I first bought an Apple system, I regretted that I couldn't find a half-respectable word processor, a problem which still exists. But an associate did point out to me, "If you've never used a word processor before, they're acceptable." Exactly.

New word processors and other software have been promised for the Apple which will make it perform better and better. Now for problems: disk space. Only 140K per disk, which is a very serious limitation for a lot of software, especially filing. This makes Apple toy-like in some respects, and although 640K drives are obtainable, not all software may work with them. Also, an Apple system might start at A\$2000, but expect to pay at least A\$3000 getting it up to a performance level you may need.

It is too easy to become excessively technical in comparing internal memory, disk space, operating speeds and software compatibility, while overlooking something more basic but just as important, e.g., the keyboard. If the keyboard is lousy (whether you have a "mouse" or some other pointing device or not), everything you're going to do with your computer is going to be lousy. The Apple IIe has a very tiring, unpleasantly raised keyboard. The Apple IIc is yet another step backward, with cheap calculator-like keys. It's amazing to think that people



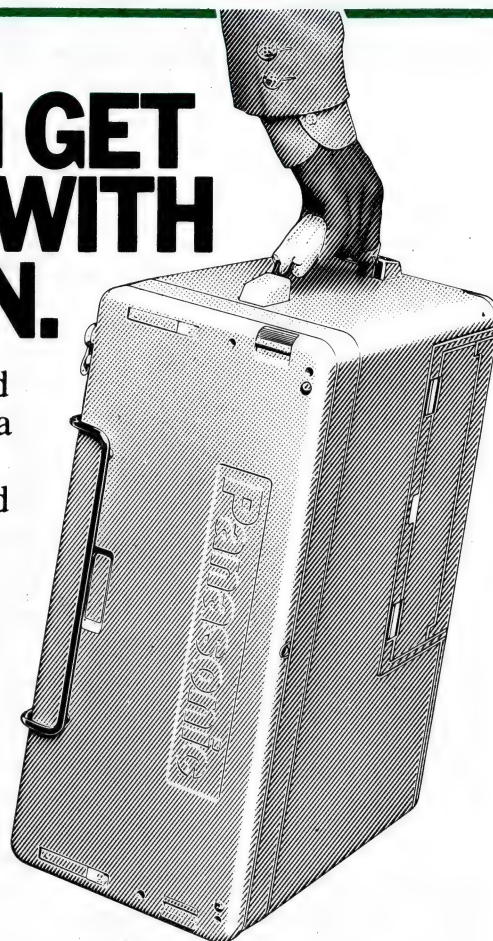
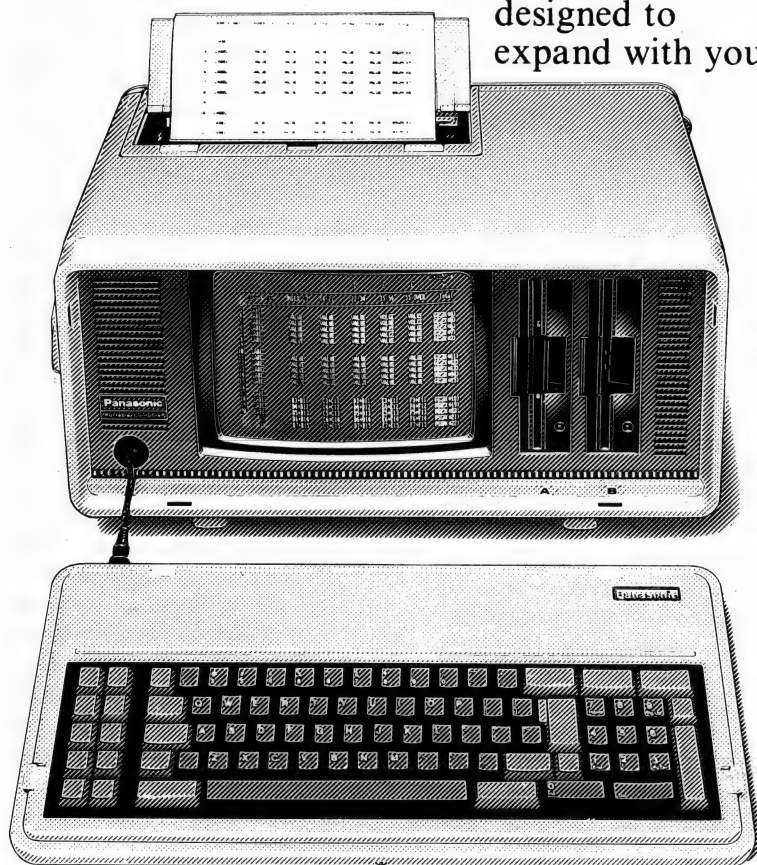
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## The Macintosh is arguably a piece of software that includes a computer as part of the package.

actually buy IIC's for word processing — usually because they are unwilling to spend more on an Apple IIe. As a portable to be carried from office to office, it is attractive to consider, but not otherwise.

### PC-DOS and MS-DOS Software

When IBM introduced its personal computer, software houses leaped onto a roller-coaster that hasn't stopped, and the market matured quickly because of it. Everybody who was anybody in software now has programs for this machine. Just as with CP/M and Apple, IBM established an industry standard referred to as PC-DOS, which was designed to be similar in appearance to CP/M. Other biggies in computers and electronics followed suit and adopted PC-DOS as their standard as well. What's strange about this is that the 8/16 bit standard was supposed to be MS-DOS, or "Microsoft Disk Operating System". PC-DOS is compatible with MS-DOS, but MS-DOS is not necessarily compatible with PC-DOS. The MS-DOS standard was delegated to lower importance because PC-DOS allowed for direct screen access. High speed, high resolution graphics and colour are not possible under the MS-DOS. Flight simulators, 3D pie charts, and so on, are characteristic of PC-DOS. Why then even consider MS-DOS?

Many MS-DOS machines can use PC-DOS. One example is the Zenith Z-150 which is sold with MS-DOS, but which will run PC-DOS without difficulty. Other machines are MS-

DOS only, like the Tandy Model 2000. A manufacturer who wants to make a PC-DOS machine must design something that performs very close to the original specifications of the IBM PC. It must have exactly the same speed, the same memory layout, and the same microprocessor. True, one can improve upon it by adding faster disk drives, more memory, extra expansion facilities, high resolution monitors, better keyboards and so on, but you still can't get away from the fundamental design.

MS-DOS machines are not straight-jacketed by this limitation. The Tandy Model 2000 uses a different microprocessor, has better graphics and performs significantly faster when doing internal calculations (when not using a disk drive). But because of this, the machine is isolated from a lot of software. Are you absolutely sure that you want to make such a sacrifice? Are you absolutely sure that a year later you won't find a program that you would want, only to discover that it's available for PC-DOS and no other system? Tandy does not have a good reputation for supplying a variety of programs for their computers.

Is a Tandy Model 2000 or other high performance MS-DOS machine worth considering? For word processing, for database, no. You don't need ultra high speeds for word processing, and if the job at hand is filing, then your major concern should be the speed of the mass storage device, not internal operating speeds. For spreadsheeting speed is important. But then, are you willing to spend that much on a Model 2000 when a CP/M or Apple computer does virtually the same thing, even if more slowly?

A contemptuous way to describe a PC-DOS machine that is not an IBM is to refer to it as a "clone" or an "IBM copy". It seems to suggest that everything but the IBM PC is a cheap and nasty rip-off, when in fact, almost every PC-DOS maker reckons himself to be competing against IBM, and thus offers something better in their machines to make them valid alternatives. The irony is that the IBM is

probably the most expensive system — feature for feature — yet the best seller. The reason for this is IBM's image and its initially brilliant marketing.

I'm not saying *don't* buy IBM. If you are satisfied that you have found someone whom you can trust to buy your computer from, and he happens to sell IBM, then consider IBM as a good potential choice. What I'm saying is don't be afraid not to buy IBM, so long as you take one precaution. Ensure that the system is a true PC-DOS machine that will run *all* PC-DOS and IBM software.

### Macintosh Software

The Macintosh is arguably a piece of software that includes a computer as part of the package. It has appeal, especially among old Apple faithfuls and university students. It does nothing that other computers can't be made to do, bar graphics, and it is very consistently presented. In my own case, I'd rather use a PC-DOS or CP/M machine to do word processing, spreadsheeting and so on, because I feel that these tasks can be performed with less hassle. Dollar for dollar, I don't see it as good value yet — its price structure is set by a desire for it not to interfere with Apple II sales, while attacking IBM — but a lot of interesting software is appearing and any final opinion has to be reserved for a later date. Make sure, whether you are looking at a Macintosh or not, that all the software you think you'll ever need exists before you buy. I recall that a salesperson once emphatically promised me that the Tandy Model 16 would eventually have lots of great software. A year later, I still don't see any.

### Assorted precautions

As for anything just off the design board — unless it is compatible with an existing range, treat it with extreme caution, even if it is made by the biggest computer company in the world. Even they make mistakes and market flops — take the Apple III and Lisa; or (as I predicted as soon as I saw it)



## Now, a multi-user system that lets you add users without losing performance, and supports LANS of IBM PC, NEC APC III and Microbee architecture.

The Pulsar "System 9000" is a Multi-User 80186 based system running at 8MHz. Each system may be expanded to 60 users, with each user having their own 256K or 1 Megabyte of Ram and a unique 80186 @ 8MH.

The system has hard disk capability to 1000Mb with floppy disk back up (either single or dual drives) of either 8" or 5.25" with 1.4Mb per floppy. Also available 5Mb removable hard disk and 45Mb streaming tape.

Each system has a minimum of 4 bidirectional RS232C printer ports (expansion to 16 ports is available).

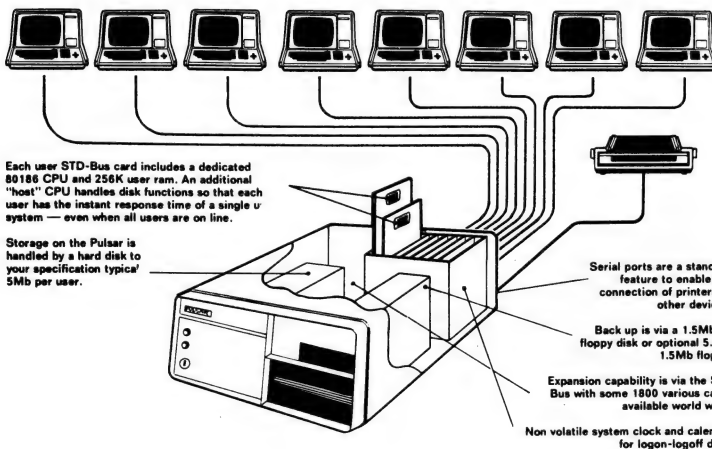
System 9000 uses the industrial standard STD Bus concept allowing the use of various cards including colour graphics.

The system 9000 has been designed by Pulsar Electronics in Australia to meet Australian conditions.



**Network Speed**  
— Bus Lan = 7Mbps  
— External Lan = 1.5Mbps

**Languages**  
Basic, Cobol, Fortran, Pascal, C and most others



**DIMENSIONS:** 49 cm W x 80 cm D x 18 cm H

**ENCLOSURE TYPE:** Desktop

**POWER:** 240V AC, 50HZ

**CPU:** 80186 @ 8MHz (host) - Z80-B @ 6MH (each user) - 80186 @ MHz (each user)

**MEMORY:** 256K ram (expandable to optional 1Mb host) - 256K ram (each user) expandable to 1Mb

**NUMBER OF WORKSTATIONS:** 1 to 60

**NETWORK SPEED:**

— Bus Lan = 7Mbps — External Lan = 1.5Mbps

**DRIVES:** Hard disk to 1000Mb - Floppy to: 1.4MB - 5Mb removable hard disk - 45Mb tape

**DISK ACCESS TIME:** Hard: 30ms max. - Floppy: 91 ms 3 ms T/T

**DISK TRANSFER RATE:** Hard: 5m bits/sec - Floppy: 500K bits/sec

**DISK INTERFACE:** Intelligent controller with full error detection and correction logic

**OPERATING SYSTEM:** Turbodos/MSDOS 3.1

**LANGUAGES:** Basic, Cobol, Fortran, Pascal, C and most others

**APPLICATIONS:** All standard CP/M and MSDOS software will run on the Pulsar system 9000. Principal applications include education, financial, planning, word processing, data management and accounting.

**AVAILABILITY:** 14-30 days from acceptance of order

**INSTALLATION:** Carried out to your specifications by Pulsar personnel

**WARRANTY:** Full 12 months warranty all parts and labour.

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the PCjr, by none other than IBM. Even they can't defy market demands — only monopolies can do that.

Finally, if you are looking for vertical market software, and find the ideal program, then except for reliability, other considerations fade into the background. You would be silly to by-pass such a program just because you prefer the look of a Macintosh or the range of secondary products available on a PC-DOS computer.

When I first became involved with computers, I bought everything from a particular big name with which I felt secure. A disk drive which I could have had elsewhere for A\$200, I paid A\$500 for, and so on. Yet in retrospect, I view myself as rather silly for paying out that extra money. My philosophy now is to invest in compatible equipment that is available for about half the price of leading brands,

and this has so far worked just as well. I have dealt with some minor incompatibility problems, but none has ever made me regret my purchase. Should you decide to do it my way, select a reputable computer store and buy all your equipment from the one source. That way it is the responsibility of the store to ensure that everything you buy fits into everything else you've bought.

Large or small, confirm that the product is consistent with some industry standard, or that the manufacturer has been in the *microcomputer* business for a few years. It has become very stylish for some well known names to enter the market with their own personal computers, compatible with nothing, and then drop them, deciding that they can still make more money concentrating on, say, car radios.

The computer you buy should have, or should have the facility for, a parallel printer port, a serial interface, more than two disk drives, a hard disk, and 25 line by 80 column display. If you are looking to add more than one computer, it should also be capable of supporting a "network" card for linking them together.

Almost all printers have a parallel port connector. You can connect a printer via a serial port instead, but this is usually an optional extra that will cost you A\$100-\$300 more. A non-standard printer interface means that you must buy the printer from the same source as the computer, limiting your selection. An 80 column by 25 line display is the accepted size for displaying information. Hard disks need further discussion.

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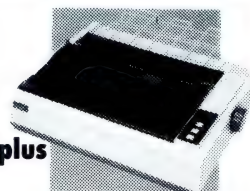
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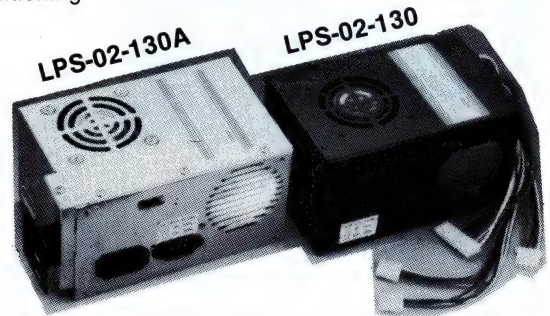
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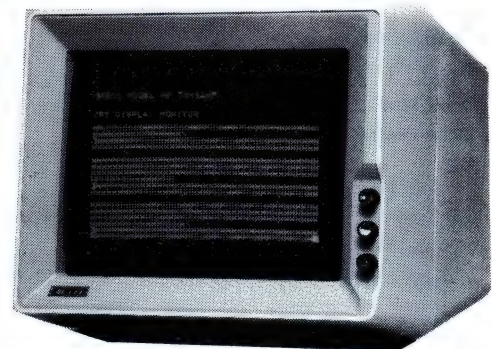


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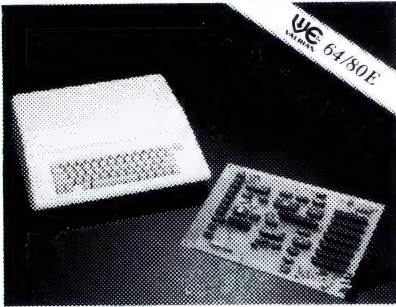
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INQUIRY 40

## Integration

Now for productivity software, which I've split into three categories: word processing, spreadsheet and card filing.

Word processing can be performed by every computer mentioned, and in basically the same way.

Spreadsheets are possible on each system, although a fast internal operating speed is an advantage. Some systems support, or can be expanded to incorporate, a 132 column display, letting you see more of your spreadsheet at once. This is possible if you have a high resolution monitor.

When the job required is record keeping and filing, the mass storage device used is a major concern. Enormous filing jobs — patient record keeping, etc., at least require a hard disk. This is a device that typically stores between 5000-40,000K and has

the advantage of being isolated: cigarette smoke is not going to damage it as with other more sensitive mediums; and it is also faster. Internal memory or operating speed is of little consequence under these circumstances, and an Apple, CP/M or PC-DOS machine is going to handle the task in much the same way.

**Best is not the  
cheapest nor fastest.  
It is the computer that  
FITS your business.**

Supposing you wanted to use your system to do word processing, spreadsheet and filing, then investigate what is known as integrated software. Programs like Symphony, Framework and Open Access are the better known ones — though not necessarily the best ones. These programs combine all the mentioned functions and others, such as telecommunications — talking with other computers over the phone — into a single package. The advantage is that you don't learn five or six different programs, but one single big one. It also allows you to take information out of a file, put it into the spreadsheet where calculations are performed, and then put the new figures back into the file. This would be handy for calculating staff pay. You could also take the figures removed from the file, out of the spreadsheet and into the business graphics section, and so on.

Having all these facilities in memory at once, with room left over for your own data, requires a lot of internal memory. At least 256K in some cases, and often 512K to make the program comfortable to use.

A negative for integrated software is that each application is not necessarily as strong as it might have been, had it been a stand-alone package. You might be better off buying stand-alone packages that

are capable of communicating with each other. In which case you are sacrificing ease of use, at least until you've mastered each program individually. At the moment, I believe the best software packages are those that look alike and communicate with each other, but which can be bought piece by piece, as needed.

## After the Sale

Whatever you buy, it is going to be useless, unless you know how to use it. You could spend weeks unravelling a computer in frustration, or you could be using it in a few days, provided that you are properly trained. An attractive looking showroom and some well known brand names give no assurance that you are going to receive the service you expect, because what you receive is determined by the scruples of the manager. There exist, unfortunately, those companies — many very successful — that promise nothing less than everything, and then treat the customer as an annoyance, after the exchange of receipt and cheque. Get everything that is promised: hours of training, additional service, and so forth, in writing, otherwise it is worthless. And if you find yourself dumped with something you don't know how to use, pressure them to refund your money. Better still, get in writing the option of a full refund if you're not satisfied with the first 10 days of service. Some people claim there is no such thing as after sales service — there certainly is, so make sure you get it.

I have concentrated more on the bad than the good. Provided that you are willing to spend time learning how to use your computer to its potential, you will find it an invaluable tool, and one of those mentioned, or possibly some other, will definitely suit you better in terms of price and capabilities. Best is not the cheapest nor fastest, nor is it something that can be judged for you. Best is the computer that fits your business as your gloves fit your hands. □□□□□□□□□□□□



# The Death of the Dedicated Word Processor

By LAUREL ALLEN

---

*Four top-selling word processors compared;  
Multimate 3.3, Microsoft 2.0, WordStar 2000, and Samna III*

You probably love the word processor you use. We all do. You've made enormous commitment in intellectual energy, learning to master its depths and command quirks. Probably, the more complex it is, the more commitment you feel. Like the brand of "add an egg" pre-mix packet cakes, you have added an egg. In this case, the egg of your own intellectual energy. So, naturally, you feel a commitment to your brand of word processor.

This review looks closely at the three top-selling word processors in Australia — Microsoft Word 2.0, Multimate 3.3, WordStar 2000 and also, a fourth new product on the Australian market, Samna Word III. A chart compares the four and a brief comment is made on each product.

Ten years ago, to get a word processor, you had to spend A\$30,000, and buy a special purpose computer with a special keyboard. These were called dedicated word processors — machines devoted solely to word processing. In Australia today, you can spend A\$700 on software, and A\$4,000 on hardware and get more power and more features.

Today, you can choose from a range of packaged software and run it on your choice of compatible.

The first WP products were the IBM display writer, the Wang system, and the Remington NBI. Then the inventors of Multimate made the break. They offered an off-the-shelf package that did the same thing as the dedicated systems — the NBI 3000, the Wang WP 20, and the IBM Displaywrite.

As a person responsible for a national listing service of new software, a question I was often asked last year was "Which is the word processing package that emulates the Wang dedicated word processor?" The answer is Multimate. Multimate has led in the non-dedicated WP realm since June last year. The A\$695 product tops the list for sales in the compatibles' word processing software market.

But Multimate may not rule for long. This year, Multimate's recent supremacy is threatened by new products, and by new versions of old products. Three contenders vie with Multimate 3.3 for the throne of corporate, government and institutional

word processing in Australia — Samna Word III and Samna Plus, WordStar 2000 and 2000 Plus, and Microsoft Word 2.0.

This review looks at these products without their extra modules. WordStar 2000, for example, has Plus, which gives communications, a table of contents utility and a semi-automatic index function, as well as a mail-list database. The extra module to Samna Word III is also called Plus and provides a spreadsheet and a key-word search database. But we shan't look at these for this review, except in passing.

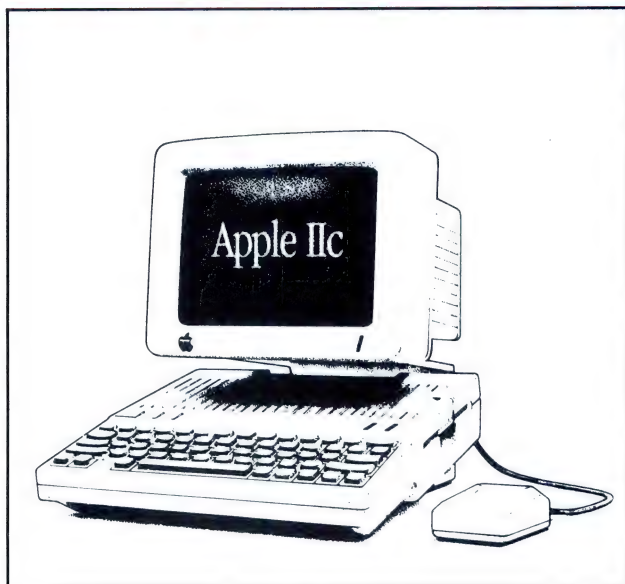
The sort of feature that you would expect to find in word processing software suitable for complex documents and office mail merging are these — right justify, multi-columns, hyphenation, global search and replace, automatic sort, spelling checker, phrase storage and retrieval, automatic footnotes, maths, indexing, password security, background printing and on-screen help menus. You'll find some of these features and many more compared in the chart with this article. A feast of features makes word processing software move towards newer, simpler, cheaper ways to do more things.

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*Laurel Allen is a freelance professional computer writer.*



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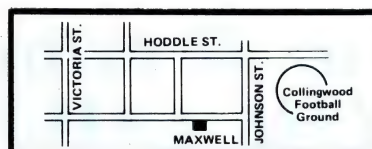
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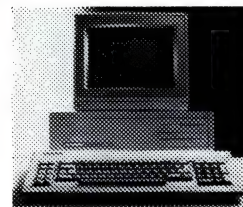


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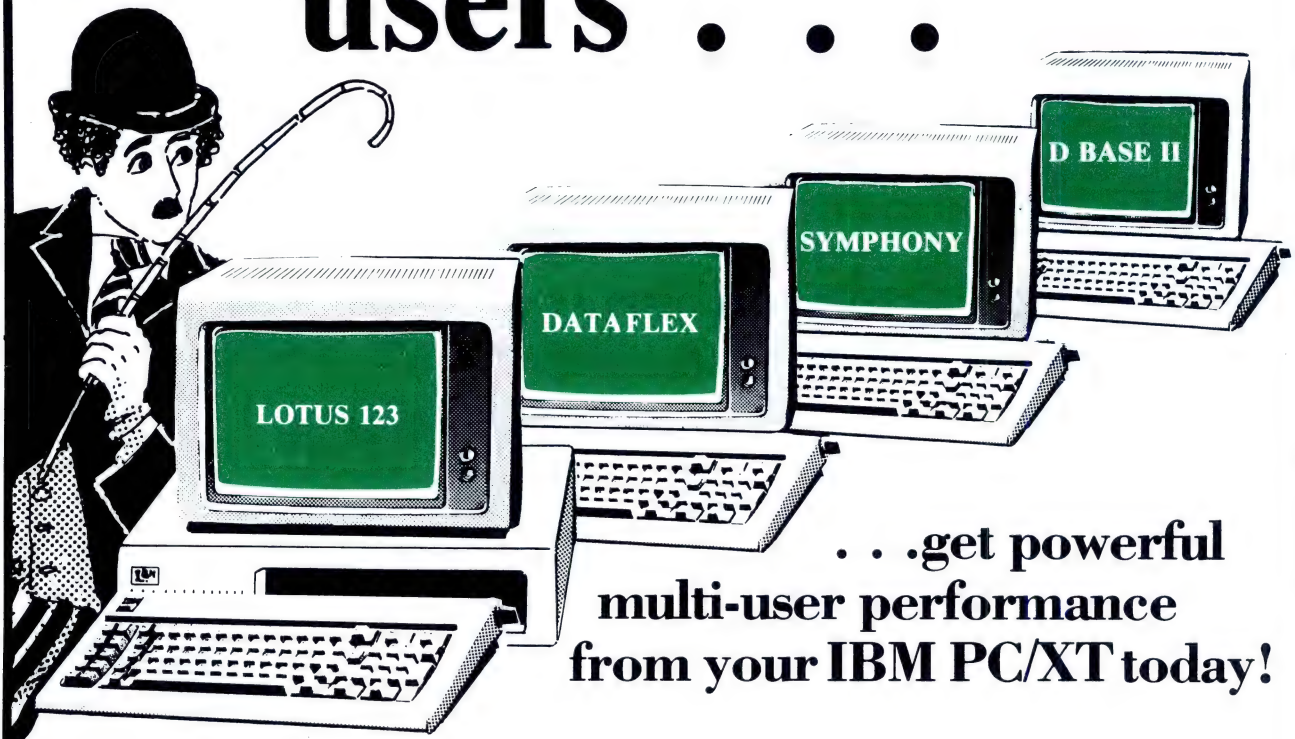
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A single small extra feature can sell a product. To follow an example through, if you work in a university, you'll probably want to do footnotes for academic reports. If so, you'll want to look at WordPerfect, Microsoft Word, and Samna Word, and later in the year, the new version of Multimate, version 4.

Automatic footnotes mean that you just mark with the cursor where you want your superscript number or mark, and then, in a separate window or file, depending on the way your software works, you write your footnote data against the footnote number. Your footnote place will be marked with a superscript, and as you add more footnotes, the numbers will automatically change into the correct sequence.

If you write government reports, you'll consider paragraph numbering, as well as footnotes, and probably indexing and table of contents, all as important features. You can get these at the moment combined effectively in Samna Word III. While WordStar 2000 Plus offers footnotes, paragraph numbering and indexing, you'll find the indexing much easier in Word and Samna.

If you make your living from writing, or if you write a lot of complex reports, you may find that Samna III and Microsoft Word's active windows and creative formatting features suit you well. If you edit regular publications, then you'll find that Microsoft Word 2.0 has special capacity in fonts, particularly for output to the HP Laser print and the Apple Laserwrite.

Not everybody knows that these differences exist between the popular brands, and even between versions of one brand. Those who have the opportunity to shop around, and use different software on different machines are aware of the differences. Despite their many lovers, some word processors work with neanderthal procedures. Just a year's development on the market makes a marked difference in word processing utilities. The fiery competition means speedy updates and additives to existing products.

The best-selling software is not always the best product. Dealers push products for reasons other than the simplicity and elegance of product design. They might earn more money on a particular product, or they know one product well, and haven't the time to learn to demonstrate another, or they may earn money from a training programme they know they can sell to go with the product.

So, even if you know and love the word processor you use, take some advice — try others. You may just find that another product may be more suited to your needs.

The best way to do this is to try out the demonstration disk. For between A\$2 and A\$12, you can get tutor disks which will work on IBM and compatibles. You can get these from the distributor or from your computer dealer. These will give you a taste of how the product works. Some of these demo disks are good and some are not so good. For example, the WordStar 2000 disk is extremely simplistic. The Microsoft demo is more meaty. You'll probably find enough to see if you want a hands-on demo from your dealer. When you get your demo, make sure your hands

**People who push a lot of words around will value Samna III's new fancy features.**

only touch the keyboard. You'll find you get a better understanding more quickly.

Samna Word III meets Australia's current word processor top of the pops head on. Samna offers many more features than Australia's current top selling 16 bit word-processor, Multimate, although the new version, Multimate 4.0, coming in mid-year, has new features to offer. Samna III will undoubtedly reach the short list for the 60% of new computer purchasers who will buy word processing software.

The Australian distributor, Arcom Pacific, feels confident enough to predict sales of 10,000 in the 1985/86 year. Arcom are well-known for their competent technical support of soft-

#### AT A GLANCE: SAMNA III

<b>Name</b>	Samna III
<b>Applications supported</b>	Editing, mail merge, four function math, spelling checker, indexing and table of contents
<b>Additional utilities provided</b>	Samna III Plus gives keyword text search
<b>Manufacturer</b>	Samna Corporation
<b>Australian distributor</b>	Arcom Pacific (07) 529-522
<b>Price</b>	A\$795
<b>Requirements</b>	380K, two floppies, or one hard disk. DOS 2.0.
<b>Computers</b>	IBM PC, XT, AT, compatibles with MS-PC-DOS 2.0, PC 3270, CP/M-86 on DEC Rainbow.



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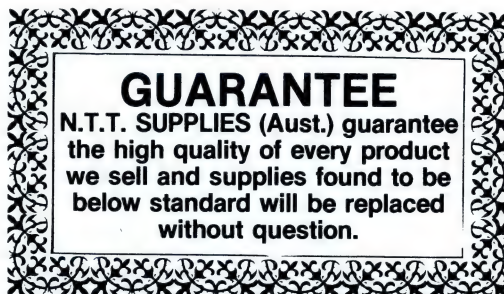
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ware products and already handle the Digital Research product range in Australia.

People who push a lot of words around will value Samna's new fancy features. One of these is a horizontal two-window split which gives two workable files on screen at the same time. With two key strokes, you can move from one window to another; with eight keystrokes, you can copy from one to the other. WordStar 2000 also offers windows, but only for viewing text.

One useful "Hey! Wow!" extra is a zoom. The zoom, like the MacPaint ShowPage, lets you see how your finished page will look. If you like to use the windows to work on parts of a page, then you'll find this handy. You also get some primitive graphics — basically, the ability to draw boxes, which is great for plans, bar charts, flow charts and for fussy people who like to present immaculate reports framed with machine-age rectangles. These print out on a non-graphics printer — and will make your printer do things you've never seen before. The commands shake the printer, as your printer platen rocks backward and forward.

But while Samna notably provides more comfort, fine-tuning and fancy features, Samna also runs slowly on a disk system. Written in C, as is WordStar 2000, (to make it easier to debug), rather than assembly language, Samna's design also makes it vulnerable to power fluctuations. But Samna solves potential data loss problems by automatically formatting every five seconds. Samna designers plan to offer more speed in later versions by rewriting some customer-tested and acceptably bug-free sections in assembly language.

The speed issue may deter heavy users without a hard disk, particularly if they use Samna on an IBM PC with a color graphics adapter. A November 1984 Byte survey showed that Samna ran three times slower on an IBM PC system with the IBM color board. A flicker problem was also evident with Samna on the IBM color monitor. The lesson is if you have a floppy disk system use Samna on a

mono adapter and monitor. The tests showed Samna fastest on a Sperry PC in turbo mode, and next on an IBM PC with mono card and monitor, followed marginally by the Sperry PC in normal mode.

Those who plan to try Samna on a compatible with MS DOS should note that function keys uses differ between different brands of compatible. Deleting and inserting material can be time-consuming with long paragraphs; you have to wait for the automatic formatting to end before you can resume editing. But the trade-off is that you don't have to stop and save while you work. Samna will make three windows on one document, and you can work in all of them, e.g., a chart in one and two related reports in another. Automatic footnotes, paragraph numbering, and index and table of contents, add to Samna's current appeal.

But while Samna's strengths pioneer new standards in word processing, Samna is not better in all respects than its competitors; for example, it has a US English, not an Australian English spelling checker as competitor, Multimate, has. The Samna checker is not fully integrated. Samna has no communications, as has WordStar 2000 Plus. Otherwise, Samna runs ahead of the pack at the moment on a feature by feature comparison.

Most obviously, Samna uses the keyboard more creatively and makes the job easier. Transparent overlays label the keys and, for example, turn the IBM cursor control keys into an easy to understand text moving system. Like the Wang dedicated system, the Go To key is circled by the cursor direction keys.

For example, use Delete, plus one of the cursor quantity keys, Word Sentence Line or File, and you delete the word, sentence, line or file you have marked. Microsoft Word offers similar simplicity of block marking and moving, particularly with the mouse. But in Samna, you can do a lot of selection with the right hand in the cursor selection block. Like Word and WordStar 2000, Samna also offers an undo key. If you wipe out

your file by mistake, you can use the undo key to change back your last command. These keys also move the cursor where you want to move it; with one keystroke and one hand you can move the cursor by sentence, line, paragraph or page.

The function keys, also, are treated differently from other word processors. Instead of giving every function key each a number of different uses, eight have only one use, and two have many functions. F5 and F9 are start keys for a number of functions. This probably achieves its intent — that of making the commands easier to remember. Samna's major marketing thrust, however, is to provide an off-the-shelf package for the compatibles' market which will rival in price and performance, the dedicated word processors — IBM's DisplayWrite 2, Remington's NBI, and the Wang system.

Samna therefore supports the advanced features of the kind found on dedicated word processors; hyphenation, automatic pagination, math functions, indexing, spelling checking, column mode, right and left justify, and a small degree of WYSIWYG — "what you see is what you get" printing from the screen.

You don't entirely see what you get on Samna, as you do in Microsoft Word 1.15, but you see more than you do on Multimate, where the screen is littered with cryptic markings, the sense of which will only be seen at printing. Samna won't give you italics and while you do get sub and super script, you don't see them on screen. Samna gives the Typewrite mode, for direct typing to envelopes.

Samna translates ASCII and DIF files, but slowly. This it does character by character as it puts the spaces back in — you end up with an immediately usable spreadsheet. In general compatibility, early US surveys, however, report an overall excellence for Samna, except in the field of ease of interaction with other applications. Samna Plus includes not only a spreadsheet, but also a key word search. Reportedly, it takes about a minute to search a full disk. This is similar to the database search



utility available on the large multi-terminal Wang systems called Management Statistics. This means that you can search through all the text in all your files and pull out files with certain subjects, or character strings without knowing the file name — all the files with your name in them, for example. Samna's manuals are bound like a prestigious book in grey and red, and are labelled Volume I and Volume II. Not only do they look great on the shelf but they also contain clear, understandable instructions in large print in a tidy binder with easy-to-turn pages.

WordStar, Samna and Multimate are all variations on a common theme. Word, however, dares to differ. Word offers a mouse, and a graphics approach to screen management. Because it has more graphics powers you get more fonts on screen — and up to eight active windows. You'd be foolish to use Word without the mouse. The mouse adds power and speed to your work. But it's a relatively new idea, and users feel a little wary. Because of the graphics, Word also requires a color/graphics adapter whether you have a color monitor or not.

Word looks particularly attractive in color. Word is one of a family of Microsoft products, all with the same commands. This means that if you learn the keyboard 'Transfer Load' instruction in one Microsoft product then you know it in Word. People who have worked in Multiplan should feel comfortable in Word.

Mouse and the graphics are most obvious differences between Microsoft's offering and the other three word processors discussed in this article. As with any healthy software produced in a competitive market, Microsoft Word is regularly updated with new features. The newest update, from 1.15, is 2.0. This update needs 256K as opposed to the previous 192. It adds hyphenation from an integrated spelling and document dictionary. Also, you get the ability to suppress menus — thus allowing three more lines on screen. You also get better screen viewing of punctuation, tabs and paragraph

marks. Importantly, you can leave Word resident and move through to other MS DOS programs and return to your document. In an era of product integration, this is a useful feature. Microsoft Word also has the most usable windows of any of the four products. For those who have discovered the benefits of live windows in both complex documents and software integration, this is a special extra. Word is the only one of the four which connects to the Apple Laser printer. When typographic products are released in Australia in the next few months, Word users will save plenty on layout and typography costs. Microsoft usually excels in documentation. But other companies are catching up with intelligently simple manuals. Microsoft is bringing out an entirely new manual for Word 2.0. It was not available at review time. The pages of their manual even smell good and they use quality paper and carefully considered typography. This attention to detail gives Microsoft products a clean, contemporary atmosphere.

Microsoft try to make their software easy to learn and claim that you can use Word after 15 minutes. It's

## Word 2.0 dares to differ. Word 2.0 offers a mouse, and a graphics approach to screen management.

true. It is easy to use. But for a first computer buyer, the disk copying routine to begin with might put them off for life. Word comes with all the usual attractive Microsoft fittings — clear plastic shelfbox, lie-flat spiral ring-bound manual and tutor disk.

If you have a color monitor, you'll get a cosy rainbow-colored screen. Even the colors have been chosen with taste and attention to detail, unlike the grim glittering visage of Multimate on a color monitor. A person of taste chose the Microsoft screen colors. The copywriter uses the word "You" often and rewards your efforts with folksy congratulations.

### AT A GLANCE: MICROSOFT WORD 2.0

<b>Name</b>	Microsoft Word 2.0
<b>Applications supported</b>	Editing, mail merge, integrated speller/dictionary
<b>Additional utilities provided</b>	Mouse, fonts on screen
<b>Publisher</b>	Microsoft
<b>Australian distributor</b>	Microsoft Australia
<b>Price</b>	A\$550, A\$715 with mouse
<b>Requirements</b>	256K, one drive, 80 col mono monitor or Hercules Graphics card with IBM mono monitor, or a color/graphics monitor adapter working in mono or color, optional mouse
<b>Computers</b>	IBM PC, XT, AT, compatibles with PC or MS-DOS 2.0,



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Once you are in the product itself and you start to compare features, you might feel that Word, while long on on-screen fonts and the infinitely easy and variable formats, falls short in the feature race, such as decimal tabs and math functions. But Microsoft would argue — use Multiplan and then integrate your files. Word is not short on functions because Microsoft forgot them, but because they have a different philosophy of software integration. “Why have a ten cent calculator when you can have a whole spreadsheet?” they say.

You do get mail merge — a particularly easy to learn and use approach and a spelling and dictionary programme, now integrated — no disk swapping to clean up your typos. You don’t get indexing and table of contents and database. You do get some communications services — ways to prepare your documents for sending so that they don’t make your modem fall over in the middle of a message. This is a new feature, called PLAIN, because it sends your documents without the control characters that can confuse a modem. It means that your document arrives looking like a real document instead of ASCII spaghetti.

Word has some very good features. Once you get the hang of the mouse, you’ll wonder why you were devoted to the keyboard for so long. The fonts on screen also will appeal to those weary of the intellectual overkill of learning the equivalent of classical Greek in conversion commands just to crank out a bold heading, italics, bold-faced, underlining, small caps, double underline, subscript, superscript and strike through.

You also get automatically numbered footnotes at the end of the document, the end of the page, and many other non-standard features.

Word links with laser printers. This printer heralds a new leap in print processing. Combined with a page-formatting word processor such as Microsoft Word, with its 64 fonts in variable sizes as supported on the Laserjet, people who deal in printed documents can expect to save large sums on typesetting costs. A page or a document formatted on Word, and then printed on the Laserjet looks like a typeset and printed page. As typeset and artwork costs currently run to around A\$50 a page and more, people with short to medium run regular publications can do the whole thing in house with Word, a Laserjet and a collating machine.

Microsoft Word does a number of things differently. For that reason, perhaps, it’s not a program for the traditional and ritualistic office environment. Instead, it’s for people not frightened of the new. Word’s eight windows, graphics and on-screen fonts make its editing functions pertinent to creative workers, academics, and for hands-on report writing by the actual author of a complex report. Its other practical processing functions mean that untrained people can learn it fairly quickly and handle the usual administrative office work.

WordStar has been around for a long time. More people in Australia have bought Wordstar than any other word processor and it is probably the most pirated program in human history. WordStar versions not only work on 16 bit but also on 64K CPM systems. These dominate the market by volume.

But WordStar does not sell so well in the 16 bit compatibles’ field. Compared to new generation software, the old-style WordStar with its control commands and clumsy menus makes wordprocessing a technical ordeal. The new model WordStar is not a new version, but a new product. It is not fully file compatible with the old WordStar. Supplied is a manual as clear as gem compared to the thick-headed technical data in the old WordStar paperwork. Those who do want to transfer files from the old WordStar will find a pile of fiddly complexities awaiting them in making the move, but this is a new, easier-to-use and much improved product.

New users will find 2000 a comfortable product, offering more features than a dedicated system, as do the others reviewed here. The keyboard is markedly easier to use. Because of the use of the function keys, an operator can now do most functions without moving from the QUERTY position and keys are easier to remember — U for Undo, for example. 2000 also offers a set of seven document layouts that make life easier. These offer automatic set-ups for justified, ragged and other styles. It also has two sticky label formats and an envelope format. Although the screen viewing

#### AT A GLANCE: WORDSTAR 2000

<b>Name</b>	WordStar 2000
<b>Applications supported</b>	Editing, mail merge, spelling corrector
<b>Additional utilities provided</b>	(with 2000 Plus). Telecommunications, mailing list data base, table of contents
<b>Manufacturer</b>	Micropro
<b>Australian distributor</b>	Imagineering
<b>Price</b>	A\$595 (2000 Plus A\$725)
<b>Requirements</b>	256K RAM (320K on PC AT). Hard disk recommended
<b>Computers</b>	IBM PC, PC XT, compatibles with PC-MS-DOS 2.0



powers are better, it still doesn't show justification on-screen, or subscripts or superscripts on-screen. The mail list format will be adjusted for the Australian three-letter state soon.

In color, bold appears in white and the text is shown in green on a blue background. The windows are a new fancy extra, but don't do all the things that Samna and Microsoft Word do. While you can have three windows on screen from one file, you can't work in more than one. It's the same when you have three windows up, each with a different file. You can only save work in one. You can use the windows to bring in other applications, for example, Symphony. You would have to have a concurrent as an operating system to make this work.

Following a trend with its competitors, WordStar has also removed the copy protection to make it easier to use on hard disk. All people who have bought the protected version will get an unprotected copy of 2000 free from Imagineering.

WordStar 2000 integrates an on-line dictionary and spelling module — you don't have to buy CorrectStar as a separate package. It adds features such as decimal tab, running footnotes and column move and it is easier to use because of the new function options to the control key type commands. Improved on-screen help facilities are provided. Other added features include undo, stored rulers, tabs and indents, extra function keys, and more direct cursor movement.

You can now move by character, word, or line, to the start and end of the line, screen, block or document. To do this, you use a function key together with CTRL. WordStar 2000 users also get the choice when they install to have either new text inserted, after the familiar WordStar method, or a choice between insert and over-type.

In the math department, extras include get arithmetic and column sorting. Exhausted WordStar users control-keying through the menus back to DOS directory will be pleased with the Path command which takes you straight to DOS out of your file. While you don't get the much longed-

for fully automatic re-formatting, WordStar 2000 now automatically re-formats to current margins in some circumstances. You get some WYSIWYG screen to print powers. You'll find bold and underline on screen, at last, but not justification. One undocumented and useful device is in the numeric keys. Using different combinations, you can draw boxes using vertical bold and double lines. To do so, you touch ALT and then 222. This gives a heavy vertical line. Large dots and foreign language characters also can be achieved with some experimentation.

Large document users will like the fact that WordStar 2000 does footnotes — but a word of caution — to get the rest, viz., indexing, table of contents and paragraph numbering, you have to buy the Plus module. Even in this, the paragraph numbering is not fully automatic. To get it done, you have to index at least one item. 2000 Plus does not automatically renumber if you decide to make changes after that point.

2000 Plus gives all the new features plus a mailing list database and telecommunications services. The well-documented Telmerge communications feature is not a part of 2000, but of the extra module, called Plus.

---

**WordStar 2000 is an attractive much-improved new model with many positive and easy-to-use features.**

---

It proposes electronic mail and suggests the collection of external reports and on-line banking. The manual documents U.S.A. uses, not Australian examples, but an Australian package is in preparation and may include rebates on Australian-accessed information services. It automatically logs you on to a number in your directory, dials, and later returns you to the main menu. To use this, you need a second outside telephone line, a Hayes Smartmodem 300 or 1200, and an asynch adapter. It won't work on a multiline phone system like the Telecom Commander and you can't put your printer and modem on the same port.

2000 also makes changes to the rulers to make them easier to use but,

---

#### **AT A GLANCE:** MULTIMATE 3.3

---

<b>Name</b>	Multimate 3.3
<b>Applications supported</b>	Editing, mail merge
<b>Additional utilities provided</b>	Spelling checker
<b>Manufacturer</b>	Multimate International
<b>Australian distributor</b>	Software Corporation of Australia
<b>Price</b>	A\$695
<b>Requirements</b>	256K, two floppies or one plus hard disk, DOS 2.0
<b>Computers</b>	IBM PC, XT, or compatibles with PC-MS-DOS

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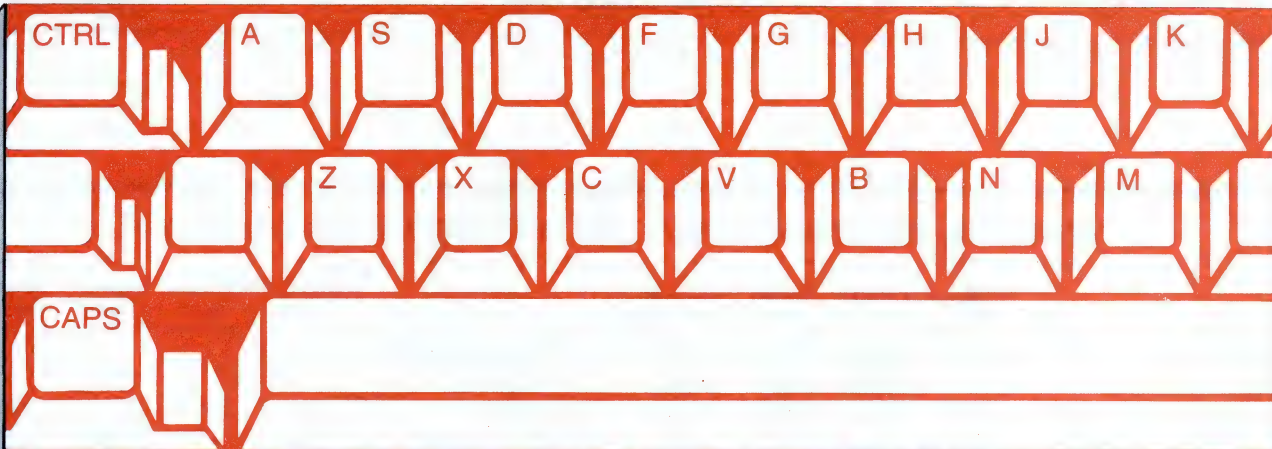
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	WordStar 2000	Multimate 3.3	Samna Word	Microsoft Word 2.0		WordStar 2000	Multimate 3.3	Samna Word	Microsoft Word 2.0
Price	\$595	\$695	\$795	\$715	Print newspaper style				
Memory	256K	256K	256K	256K	multiple text				
Interactive tutorial	YES	YES	NO	YES	columns	NO	NO	YES	YES
Auto copy & install	YES	NO	YES	NO	Vertical centering	NO	NO	YES	YES
Copyable disk	YES	YES	YES	NO	Flush right	NO	NO	YES	YES
Suppress menus?	YES	NO	YES	YES	Sample style sheets	YES	NO	NO	YES
EDITING					SORTING				
Screen format printed as seen	NO	NO	YES	YES	Alpha, numeric, up, down	YES	NO	NO	NO
Undo last move?	YES	NO	YES	YES	SPEED TRICKS				
Fast-cursor to end of word, line or block	YES	YES	YES	YES	Macros	YES	YES	YES	NO
SEARCH & REPLACE					Glossary	YES	YES	YES	YES
Backwards and forwards	YES	NO	YES	NO	Mail Merge	YES	YES	YES	YES
FONTS & TEXT					BIG DOCUMENTS				
Change font on entire text block?	YES	NO	YES	YES	Headers and footers	YES	YES	YES	YES
Bold on screen	YES	YES	YES	YES	Table of contents	NO <sup>1</sup>	NO	YES	NO
Italics on screen	NO	NO	NO	YES	Index compiler	NO <sup>2</sup>	NO	YES	NO
Double underline	NO	NO	YES	YES	Paragraph numbering	YES	NO	YES	NO
Superscript/subscript	YES	NO	YES	YES	FOOTNOTES				
Strike-through	YES	NO	NO	YES	Automatic	YES	NO	YES	YES
SPELLING CHECKER					End of page option	NO	NO	YES	YES
Australian English?	YES	NO	YES	NO	End of document option	YES	NO	YES	YES
Fully integrated?	YES	NO	NO	YES	PAGE NUMBERS				
Corrects all occurrences of same mis-spelling	YES	NO	YES	YES	Odd/even choice	YES	YES	YES	YES
Dictionary					Headers and footers	YES	YES	YES	YES
hyphenations	NO	NO	NO	YES	Dynamic repagination	YES	NO	YES	YES
SCREEN MANAGEMENT					MATHS/TABLES				
View more than one file at same time	YES	YES	YES	YES	Four function	YES	NO	YES	NO
Smooth scroll	YES	NO	YES	NO	Percentages	NO	NO	NO	NO
Work on more than one file on screen	NO	NO	YES	YES	Decimal tab	YES	YES	YES	NO
Workable windows to work on one file	1	1	2	8	Algebraic function	YES	NO	NO	NO
How many windows?	3	0	2	8	PRINTING				
Work while printing	YES	YES	YES	YES	Printers supported	140	100+	24	40
Work while merging?	YES	YES	YES	NO	Supports HP laserjet	YES	YES	NO	YES
Use windows for second applications	YES	NO	YES	YES	Supports Apple Laser	NO	NO	NO	YES
PAGE LAYOUT					Sheet feeder support	YES	YES	YES	YES
Zoom to view	NO	NO	YES	NO	Proportional print	YES	NO	YES	YES
Draws frames & boxes	YES	NO	YES	YES	Select items in page	NO	NO	YES	YES
Possible page width	240	156	250	255	COMMUNICATION				
Fold	NO	NO	YES	NO	E/Mail, Telex	NO <sup>3</sup>	NO	NO	NO
					Document preparation	NO	NO	NO	YES
					ASCII input/output	YES	YES	YES	YES
					Auto ASCII conversion	YES	NO	YES	YES
					Mouse	NO	NO	YES	YES

<sup>1</sup> Only in Plus<sup>2</sup> Only in Plus<sup>3</sup> Available in WordStar 2000 Plus

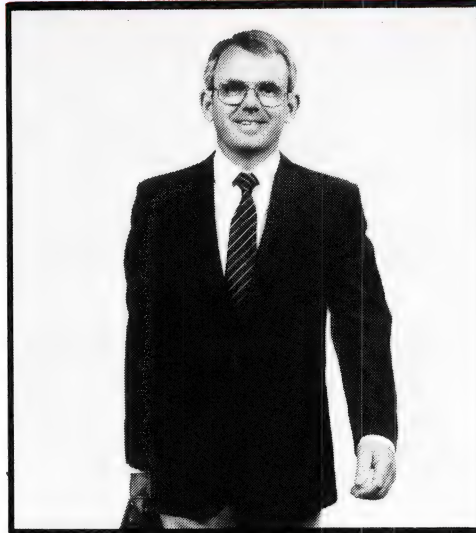




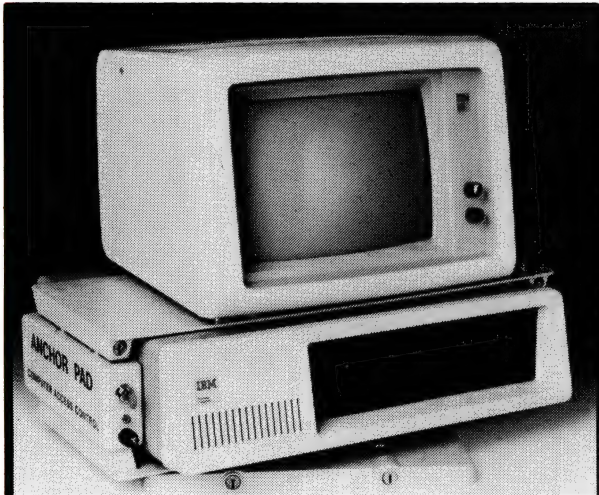


# Two experts want your computer

## Which one will get to it first?

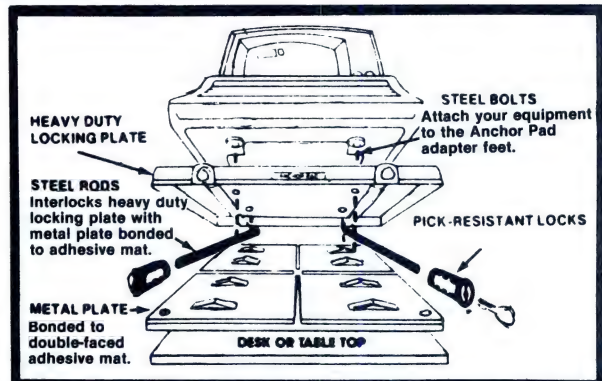


On the left side, meet Mr Jones. Mr Jones makes his living off other people. Mr Jones is an expert in stealing Computers, Typewriters and Office Machines. Last year, Mr Jones and his colleagues stole over \$80,000,000 in business equipment from offices just like yours. Yes, alarm systems were present in most cases, but the thieves were in and out before the authorities arrived. On the right side meet Mr Bertram. Mr Bertram makes his living by stopping Mr Jones. Mr Bertram is an expert on computer and Office Security with Anchor Pad. His colleagues design and install Anti-theft locking systems that stop Mr Jones. Last year unfortunately, over 95% of his customers were visited by Mr Jones first. Improve your odds. Call Darrell Bertram.



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# Why Write?

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The editor feels that people would be more interested in the opinion of a writer, rather than just reading the dry request for the submission of stories and articles that normally appears from time to time in magazines. So he has asked me to talk to you for a little while on the joys of writing.

I am a freelance writer. Most contributors to magazines are casual freelancers. The quality of a magazine is largely determined by two things. The editorial staff and the effort that they put into maintaining the standards of the finished product and the quality and quantity of the manuscripts submitted to them. The best way to improve a magazine is to give the editors the broadest possible choice of articles from people like me and the many others out there who have something to say. The world of computers, and especially microcomputers, is one of communications. A magazine article in *Just Computers* will allow you to talk to more people.

It's also nice to see that others think that what you write is important enough to place in print for sharing with others. To be able to communicate with other people is rewarding in itself. If you have got something to say, it's nice to be able to say it in a way that will allow you to

say it to as many people who share your interest as is possible.

As well as allowing you to talk to other people, the good editor of this magazine will even pay you! The more interesting the things that you can write about, the more you will be paid.

So what is the best way in which to make sure that what you write actually gets into the magazine, rather than collecting a rejection slip? Here are a few simple rules that can be followed to give your submission the best possible chance of being published.

First, write your article on a subject with which you are comfortable. If you are not really familiar with what you are writing about, how will your readers cope?

Try for a light informative style that keeps the use of adjectives to a minimum. Let the advertisements tell people how brilliant, fabulous and stupendous something is. You should be telling people how good, or bad, it is.

Once you have written an article, you should attend to the quality of its

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*Paul Beaver still works in the Computer Products Support Department of Dick Smith Electronics, Sydney.*

presentation. Believe it or not, editors are human, too. The presentation of your manuscript can have a big influence on its acceptance or rejection. You should submit a typewritten or printed manuscript (Editors have been known to accept a handwritten manuscript, but it has to be VERY good). It should be double spaced with nice large margins. Editors like large margins, it gives them a place to make notes to the typesetters and all the other people involved in turning your words of deathless prose into part of a magazine. You should make sure that there are as few spelling errors as possible. On the first page, there should be the title of the article, an approximate word count (the number of words in the article) and your full name and address. Every page should have a page number, the title and your name.

Aside from these suggestions, the only thing that I can do is to offer you encouragement. Every month, a magazine the size of *Just Computers* has a huge number of pages that need to be filled by submissions from local writers. Why not take the time to write an article? All it will cost you is a little time and it could help a whole lot of people, and make you money as well! □□□□□□□□□□□□□□□□





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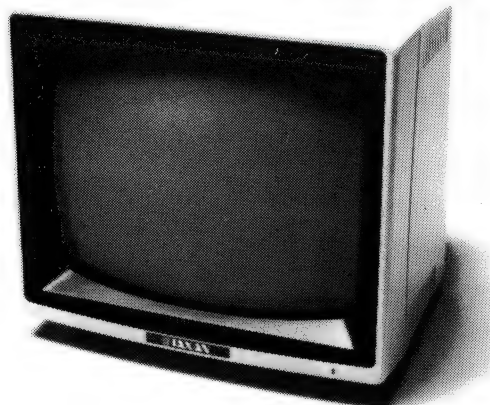
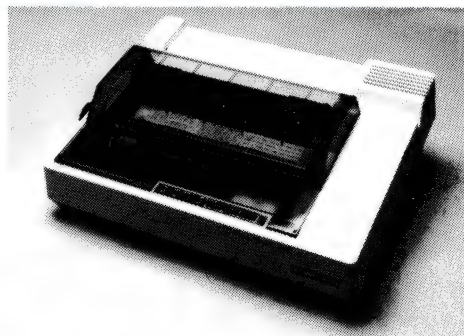


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# High Technology Ventures — Getting Started

By DAN WOLOGY

*Venture capitalists are analytical and careful people and submissions to them should be detailed and complete*

## Misconceptions

Many entrepreneurs who make a breakthrough in some area of technology, or develop an innovative product, think they have overcome some of the biggest hurdles to the pot at the end of the rainbow. Unfortunately, this is not the case and too many entrepreneurs have found this out the hard way. To the uninitiated, the world of business and finance may appear bewildering and full of promise, as it is, but it is also a world where there are very few second chances.

If you're an entrepreneur planning to raise seed capital, don't be lulled into complacency by magazine reports that venture capitalists and others are eager to embrace any promising new idea. Venture capitalists are analytical and careful people, and if you don't approach them in the right way, you may find their doors slammed in your face.

## Where to Start — The Business Plan

The best advice that can be given to an entrepreneur about to embark on a search for venture finance is to do his homework, obtain the best advisers he can and prepare a business plan.

To be successful in attracting venture finance, you'll need to develop a well co-ordinated program to promote your product and business attributes. Think of yourself as a salesman, with the job of convincing a potential customer to buy into your company, its products and management team.

Any investor is sceptical about the claims of entrepreneurs, no matter how well they are presented. The last thing that an entrepreneur needs to aggravate this situation is a casual and ill-prepared presentation.

It is no exaggeration to say that a business plan may be the single most important document that an entrepreneur will ever prepare and it should answer five very basic questions:

- Who are you?
- What do you do?
- What resources do you have?
- Where are you going?
- What do you need to get there?

It is often taken for granted that the prospective financier already knows the answers to all or most of these questions, but chances are, he does

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*Dan Wolody is a management consultant at Arthur Young and Company.*

not — at least, not sufficiently to make an investment, or a lending, decision. Even if the financier is quite familiar with the company, he probably will have to discuss the proposed loan or investment with someone else who isn't. So, a proprietor should start with the assumption that the prospective financier knows *nothing* about the company seeking finance.

The first section of the business plan should be a succinct summary of the overall plan with emphasis on the high points of the proposal, including the purpose of the plan. For example, to attract investment by professional venture capitalists, submit a characterization of the market potential of the product or service, significant product features, and major technical and financial milestones. Thumbnail sketches of the company's founders and its key managers should also be included in the summary, because, although there will be a section devoted exclusively to management later in the plan. If there is enough information on this subject in the initial summary, it will spark the interest of investors and lenders. Many investors place as much emphasis on management's past successes as they do on the new company's prospects.



Following the summary should be a table of contents, which must be specific enough for readers to locate each section in the plan without having to read through too much detail.

Under the heading, company description, the nature of the business should be described, the principal products or services, markets and applications explained, and the distinctive competence (that is, the chief factors that will account for the company's success) outlined.

As mentioned earlier, investors and lenders will want to know a lot about the management and ownership of the company, so it is essential to devote an entire section to this subject. Key managers should be listed along with a description of their skills and how their experience relates to the success requirements of the venture. It is also important to include management's track record and state how it relates to the entrepreneur's requirements.

After the management section, it is useful to include information on the number and type of personnel required in the venture, how they will be compensated, and the organisational structure of the company.

An entrepreneur entering a competitive field will find that the distinctive competence section of the plan is particularly important. It is essential that the company's distinctive competence be related to a market need.

Some brief, informal examples of distinctive competence statements are:

"Our software technology makes it easy for a customer to convert from his existing obsolete system to new hardware. This will meet an important need because conversion has been one of the industry's major problems."

"Due to a technological and manufacturing breakthrough, we will be the lowest cost entry in a market that is very price sensitive."

"We have very strong business relationships with design engineers, for customers that

order A\$50 million a year, and our product (or service) solves numerous problems inherent in developing their new product lines."

Under the section marked, market analysis, which will be the longest single section, because there are many points to cover and questions to answer, will be a description of the industry and a realistic estimate of its prospects for growth during the next decade. The industry's chief characteristics should be described, along with an indication of who its major customers are or will be; what are or will be the major applications of the product or service, and what are the major trends in the industry? Target markets and specify the major segments the company plans to penetrate. This may be one of the most critical parts of the plan.

It is necessary to assess the competition for the product or service, list competitors and compare the new product or service with theirs. What is the market share of each competitor? Will the company pose such a threat to them that they'll try to destroy it at any cost?

Any lender or investor will want to know what prospective customers think of the product or service. Have they seen or tested a realistic prototype? If so, what was their reaction?

Describe plans for marketing strategy, distribution, promotion, pricing, sales appeals, geographical penetration, and field service. What are the plans for setting priorities among segments, applications, and marketing activities?

The marketing section will be followed by a description of the proposed selling activities. How will prospective customers be identified, who will be contacted and in what order? How many sales people will be required, and how many calls will each have to make within a given period of time? What is the sales productivity of each salesperson? When providing the source of evidence for these estimates, it is vital that detailed, in-depth information be provided. Too often a company will gather some general

numbers of the size of the market and then project a market share for itself.

Technology, research and development is the next section of the business plan. Included here should be a description of the essence and status of your current technology and the patent or copyright position.

When addressing the question of what new technologies or similar scientific approaches exist that may become practical in the next five years, a common pitfall is to compare the technology the company is currently working on and will have on the market in a year or two, with the technology its competitors have on the market now. The new company's technology must be compared with what others may have in a year or two.

The next step will be to explain how the company will produce its products or operate its service. How much will be done internally and how much through subcontractors? Do any production or operating advantages exist? What is the present capacity for operations, and how can this capacity be expanded? Are there any "sole-sourced" parts and what are the standard costs for production at different volume levels?

When developing a section on the funds required and how they will be used, the first consideration is how much is needed now, how much will be needed during the next five years, and how it will be used. How much of the required funds will be raised from debt and how much from equity, must also be specified.

It is important to indicate if and when the company plans to go public. Professional investors are concerned with the future value and liquidity of their investments, and a company that's not profitable or large enough — for example, less than A\$10 million sales within five years — might not be of interest to them.

In the financial data of the plan, financial statements and projections for the next three to five years are presented. This information should include profit-and-loss or income statements by month or quarter, at



# ATTENTION ALL COMPUTER BUSINESSES

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least until break-even, and then annually to cover a five-year period. Balance sheets at the end of each year should also be included, along with cash flow statements and capital budgets.

It is also important at this stage to highlight any key assumptions made in the pro forma statements and indicate how good the assumptions are. These assumptions should reflect industry performance and "best-case", "worst-case", or something in the middle, which investors and lenders prefer. The numbers should be based on several different assumptions to ensure they are reasonable.

Although the financial data section should be as complete as possible, it is important to note that too much financial information can be worse than too little.

To assist the entrepreneur, high tech specialists can process financial projections on computerised financial models which are specifically designed for new, high growth start-up companies.

The final section of the business plan will comprise appendices or exhibits and may include resumes of key managers, pictures of the product or prototype, professional references, market studies and articles (relevant to the product) from trade journals, and patents.

## Who Else Can Help?

Many people starting a venture are short of capital, so preparing a business plan with the assistance of a financial adviser seems forbidding. For people in this start-up phase there are several government departments who can offer financial assistance for business plans and start up capital, e.g.:

- State Government agencies, such as the Advanced Technology Centre (ATDAF) in New South Wales, will provide grants of up to A\$100,000 and loans or loan guarantees of up to A\$500,000 for new ventures or businesses beyond start-up, seeking expansion capital. Likewise, the Technology Development

Authority (TDA) in Western Australia provides start up capital for new ventures as well as grants for the purpose of preparation of business plans. The TDA also have a Technology Park facility that provides a complete environment for a high technology entrepreneur.

- The Industrial Research and Development Grant scheme reimburses industrial research expenditure at up to 100% per annum (40% for commencement expenditure) to a maximum of A\$75,000, for up to five years.
- Management Investment Companies (MIC's) are public companies established for the purpose of funding high technology and other ventures.

These companies invest in the equity of the venture company and hence take the same risks as other shareholders. They are rarely interested in ventures which do not show potential for substantial sales in three to five years (A\$15m) and high initial growth rates of some 30% per annum. They usually do not want to take a controlling interest in the company (i.e. common shareholding would be 20% to 40%), but they do get actively involved in management and development of the business. The overall objective of an MIC is to float the company publicly within five to seven years of the investment, which is where the pay-off occurs.

In case you are wondering what the chances of success are then you might be interested in a rule of thumb some venture capitalists use. It seems that for every 100 applications a venture capitalist reviews, only 10 are worth following up and two will be closed. The venture capitalist's problem is how to get to those two as quickly as possible. From the entrepreneur's perspective, a well developed business plan is the best way of ensuring serious consideration. □□□□□



# NEW ZEALAND PERSONAL COMPUTER

## *Comments from New Zealand readers of our first issue* **WE ASKED FOR IT —**

"Congratulations on a publication that really fills a gap in the New Zealand computer scene." Highlight Communications, New Zealand.

"The most interesting computer magazine I've read in quite a while. Head and shoulders above the masses." Ted Coats, Tirau, New Zealand.

"Good value." Bruce Woolmore, Tauranga, New Zealand.

"Very comprehensive in range of articles." Philip Armstrong, Gisborne, New Zealand.

"Pretty good, I reckon." C. Prince, Whakatane, New Zealand.

"Good luck with your magazine which contains so much useful information." G. Ronald, Wanaka, New Zealand.

"A beautiful publication." Dave King, computer journalist, Computer Supplement, New Zealand Herald, Auckland, New Zealand.

"Best value for money in New Zealand for computing magazines." B. Wood, Wellington, New Zealand.

"Great!!" G. Pui, New Plymouth, New Zealand.

"The Reader Service, via the advertisers' enquiry numbers, is an excellent idea and it alone is worth the cost of the magazine." L. Greenwood, Wanganui, N.Z.

"Very good." R.C. Jackson, Wellington, N.Z.

"I have just purchased a copy of Just Computers and I am impressed." V.J. Collinson, Stratford, New Zealand.

There was, also, one critical New Zealand letter. In case that writer has other troubles, he shall be nameless. To be almost the only one out of step in New Zealand is sufficient punishment, and may \_\_\_\_\_ on his \_\_\_\_\_. We also take the non-sexist and charitable view that the writer was male.

The following pages (to about 170) will contain, each month, feature articles, reviews of hardware and software, computer industry and club news, etc., and advertising, all contributed by New Zealand individuals and businesses. Also included will be feature and other articles from McGraw-Hill Inc's U.S.A. Publication BYTE — material not yet on local news stands.

As only ONE version of JUST COMPUTERS is to be published monthly for both Australia and New Zealand, our policy, stated above, will enable Australian readers to have the benefit of editorial both from New Zealand and from the extra material from BYTE, as well as, in reverse, benefitting New Zealand readers.

Thus, New Zealand readers will receive, in the

same magazine as is circulated in Australia, the extensive editorial from Australian sources, as well as much extra material from BYTE and McGraw-Hill Inc's other computer magazine POPULAR COMPUTING.

To help with this arrangement, which has already proved attractive to contributors and advertisers, as seen by the support in the large number of pages in each issue, we ask that New Zealand sources start at once to forward editorial material of all the usual sections that go to make up a computer magazine. Our rate of payment for feature articles will not be as low as is our cover price, which is expected to appeal to readers, giving a very large circulation, a vital element for the commercial health of a successful computer publication.

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# A Unique Personal Computer Add-On

By MALCOLM BAILEY

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This article describes an entirely new intelligent programmable controller (IPC) which has been developed in Auckland, New Zealand. It interfaces to most popular brands of personal computer (PC) using the RS-232C serial port. The product is known as MINDER and is unique in the approach taken to its design, with the emphasis on software functions rather than hardware. In fact, the software was designed first, then the hardware was built to enable the software functions to be performed. The IPC monitors, controls, and logs; and it communicates either via the RS-232C interface to a local PC, or over the telephone network via modems. However, the IPC need only be connected to a PC while data is being extracted from its log or to download an application which is first written in English on the PC keyboard and screen.

Three examples of monitoring and control problems will illustrate the use of the IPC.

The first is a plastic extrusion plant which produces five layer plastic film from a Barmag extruder. Three of the layers are plastic and the other two adhesive. The resulting product has the three features of strength, resistance to moisture and resistance to ultra-violet light, which are not available in a single film.

The problem the plant faced was the variation in the specifications of

the raw material and the risk of an operator putting the wrong raw material in one of the feed hoppers. The result was a considerable wastage due to the inferior product. Normally, an error would only be detected when sub-standard film was produced. By connecting the IPC to thermocouples, motor speed sensors and pressure sensors during a production run of good quality film, an accurate record of the machine's correct operating parameters is recorded automatically using the IPC's self-learning feature. The company's management then decide the limits (up and down) to which each parameter can drift, before a warning should be given to the operator that a temperature, speed or pressure is out of limits. A control panel allows the operator to accept an alarm condition. If an alarm is not accepted within a specified period then an audible siren sounds to attract attention. If the drift gets steadily worse the machine can be automatically shut down, if required.

All of the incidents which occur are recorded in the IPC log for later analysis using the PC. The main benefit from the system is fewer breakdowns due to the early warning

facility. The cost of expensive machine stripping and cleaning due to breakdowns is greatly reduced. A further benefit is a permanent record of conditions under which each batch of film was manufactured; any complaints can be traced back to the moment in time and the conditions when the film was extruded.

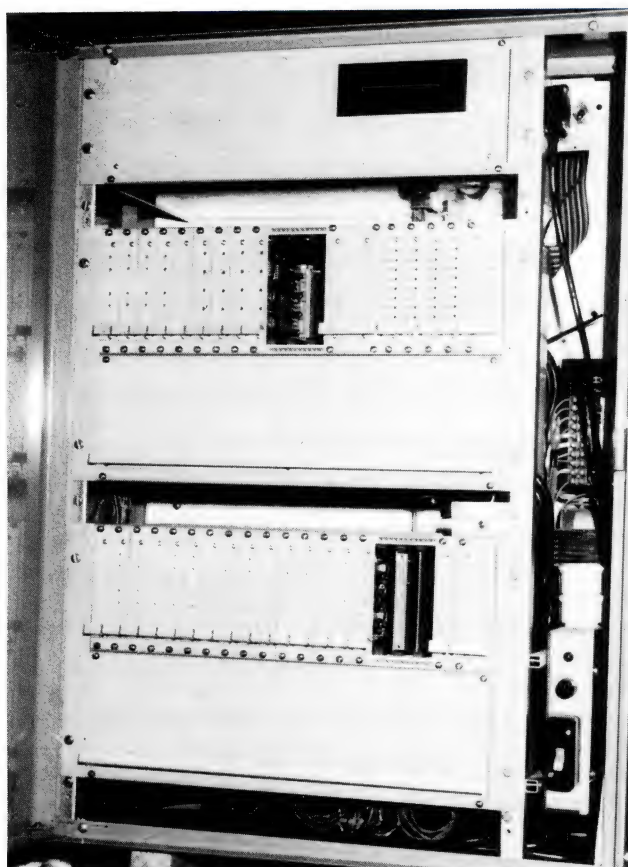
The second example is a factory which produces tufted carpet of a very high quality for selective export markets. The problem was maintaining the correct feed roller speeds, yarn tension, etc., to minimise wastage. A number of looms is involved and all are connected, via IPCs, to a PC so the appropriate parameters for each run of carpet can be downloaded accurately. A control panel is fitted to each loom and these are connected to a pair of IPCs. Each of the IPCs is in turn connected to an RS-232C port on the PC.

While the looms are running, the appropriate data is collected on roller speed, tension, etc., by the control panels. This data is then fed to one of the IPCs which controls the loom operation based on the parameters downloaded from the PC. Messages for the operator are displayed on a dot matrix display. The data passed to the PC is updated using a database package system and is then available, if required, for the mainframe computer. A full history of all carpet produced is recorded in the PC's

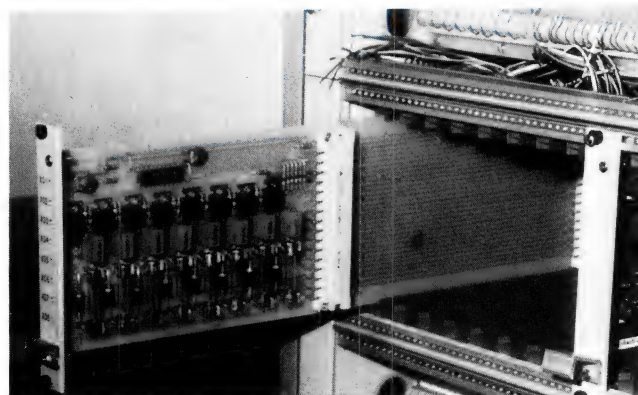
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*Malcolm Bailey is Director of Minder Systems Limited, Takapuna, New Zealand.*

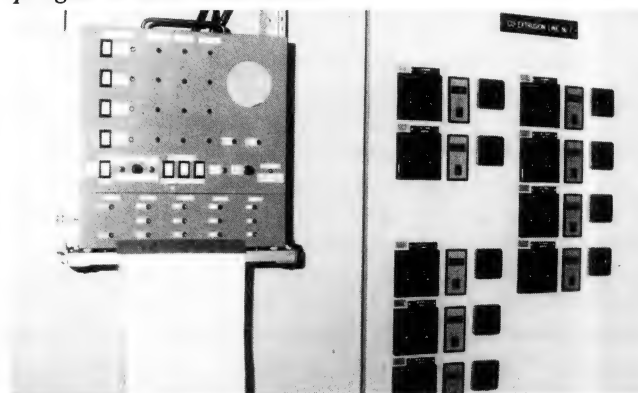




*A minder intelligent programmable controlled at an industrial installation in Auckland, N.Z.*



*Plug-in circuit card illustrates the modular approach to designing intelligent programmable controllers.*



*Typical alarm and mimic panel connect to a minder unit to permit communication with the machine operators.*

memory for future analysis and reference. The benefit which justifies such a system is the reduction in sub-standard carpet produced. With a plant output approaching 20 metres per minute it does not take long to waste thousands of dollars.

The final example is a blood transfusion centre which is part of a hospital system, but 500 metres distant. The high value of present day blood and blood products led to a request for a sophisticated monitoring system which could be linked into two PCs; one at the blood transfusion centre and the other at the hospital. A wide variety of alarm conditions is possible and it is important that each is recorded, remembered and continually advised to both the hospital control room and the blood transfusion centre until the situation has been rectified. Such problems as alarm and PC priority had to be

addressed and the whole system had to communicate over the telephone network.

In the three examples given, the IPC approach, rather than a more normal, programmable logic controller, opened up systems design possibilities which ensured the user's real needs were met. Too often a system does not meet the real needs due to hardware or software constraints. The 'soft' design approach to the IPC avoids this problem.

A major feature of the MINDER IPC is the provision of a dictionary based language. This enables the user to communicate to the IPC using English on the PC keyboard. By changing the dictionary, other languages (such as Italian, French, etc.) may be used. For industrial and commercial users, their own familiar jargon terms may be loaded into the

dictionary. All of this makes applications easy to understand and if the designer goes on holiday, or leaves the organisation, it is easy for his successor to pick up and understand the system.

By using the modem interface to the IPC, the status of a bank of machinery, the contents of the log and details of current production can be extracted over a telephone line using a remote PC. It is even possible to alter an application currently running on an IPC over the telephone, if the user so wishes. (And if you know the password!).

Other industries which are currently attracting the IPC concept are the baking industry, glasshouses and nurseries, breweries and freezing works. The applications are virtually limitless and show just how powerful and pervasive the microprocessor has become. □□□□□□□□□□



# Point of Sale Computing in New Zealand

*A history of some aspects of effective computer installations — from those involved.*

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Today's hidden revolution in retailing is the computerised point of sale system. Retailers are realising that such systems are the way to improved retail profitability. The familiar-looking cash register on the shop counter can be the front-line soldier of the revolution, while out in the back office or Head Office, a compact, inexpensive computer quietly directs the battle.

Christchurch's MicroAge Holdings Ltd has proof of the benefits to be obtained from computerising stores. One of its major customers has been able to reduce inventory by 10 per cent in two years since installing their MicroAge system. "The biggest advantage to the retailer is control of stock," says Mr. Chris Nicholls, managing director of MicroAge. "Utilising the accurate sales and stock movement information reduces stock levels with the system."

The system does not just capture sales information. The cash register holds the price of all goods in the store and accurately prices the sale when the shop assistant keys the product code. Information about charge account customers may be held in the cash register so that discounts can be automatically calculated, the cus-

tomers' credit status checked and an invoice produced, without the customer waiting. The data keyed into the cash register is passed to the computer where it is recorded as the first step in the many processing operations that will follow, aimed at providing the retailer with comprehensive sales and financial information.

MicroAge (one of the country's first specialists in microcomputer systems) is a pioneer in New Zealand in computerised point of sales systems. In 1982, it commenced installing systems in Liquorland liquor stores and the success of these installations led to an order from another liquor store chain, Wilson Neill. Other orders followed, including a sophisticated system for a Christchurch service station which automatically captures information from the petrol pumps and controls the stock in the service station's shop.

Because the system has been developed in New Zealand using standard computer languages, it can be completely customised to the user's needs. At Wilson Neill, for example, the computers have been programmed to transfer the day's trading information by the latest "packet swit-

ching" system, to the company's head office, so that the figures will appear in the following day's consolidated analysis.

Kingtron cash registers are adapted for the point of sale system. Additional memory is added inside the cash registers to hold the price look up table, the customer information, discount and tax information and other data. MicroAge's programmers also replace the program that controls the cash register with their own program to meet the retailer's requirements.

The cash register has a journal printer and a receipt printer and can be configured with a slip printer for producing invoices. Each cash register is connected by a cable to the back-office computer. Along this cable the cash register passes to the computer the transaction information from each sale. In return the computer passes to the cash register changes to its price and customer tables. The cash register stores the transaction in its memory, so it does not require the computer to be always connected to it. In fact, many days' transactions can be stored inside the cash register should the computer be out of action. (This proved a useful feature in one



# Attention All Computer Businesses

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store where burglars damaged the computer.)

It is the computer, with its stock file and a set of programs that covers the range of retail data processing requirements, which provides the most benefits to the retailers. As stock comes into the store it is recorded in the computer until an invoice arrives. When the stock is priced and put on the shelves, the computer updates the cash register for price changes so the shop assistant rings up only the correct price when a sale is made. Specials, or discounted goods, are similarly notified to the cash register and recorded separately for later analysis.

With the help of the transaction information passed back from the cash register, the computer can then keep track of the stock and associated financial information. An up-to-date stock-take and stock valuation report is available on the press of a button and accurate financial information is available by utilising a first-in, mid-in and last-in pricing system.

Individual stock items and groups or products are monitored automatically. Rather than produce voluminous stock reports, the computer works on an exception basis, notifying the retailer when, for example, the item should be recorded, or when it has been priced too low. Full reporting is also available, if requested. Daily, weekly and monthly profit analyses can be requested, with the answer to that all-important question, "what percentage profit did we make today?"

"The manager knows what the store is doing on a daily basis," explains Mr Nicholls. "The computer is doing calculations that usually require the assistance of an accountant, and doing them every day."

With prices and tax rates maintained by the system, it is easy to make across-the-board price or tax changes. A budget-night tax change, for instance, can be handled usually by running a program the next morning to adjust the prices.

The system also offers much better control of creditors and debtors. Incoming invoices can be checked by ensuring the stock has arrived and then processed through the creditors' system on the computer. Charge customers can be given an invoice which is printed as the purchases are rung up on the cash register. If desired, statements can be produced by the computer that evening.

These facilities helped one client to simplify the work load of the people processing debtors in its accounts department. Different discounts for different customers are handled simply by the system, taking a load off the shop assistant, as in the case of the liquor industry clients who sell goods at six or seven different rates depending on the customer.

A computerised point of sale system can also have unexpected benefits for the retailer. Under-rings, where purchases are charged incorrectly, are reduced because the cash register does the pricing. 'Shrinkage' is reduced because staff are aware that the computer is keeping track of the stock very accurately.

Summing up the benefits of the point of sale system, the company says the immediate benefits are control of stock, knowledge of sales on a product line basis (allowing effective reductions in stock holdings), simpler debtor processing and more effective (and more 'friendly') sales interface to the customer. The company prides itself on its ability to anticipate and deal with future changes in the industry and is currently reviewing the Goods and Services Tax with a view to implementing systems to cope with this, well prior to the 1986 commencement date. □□□□□□□□□□

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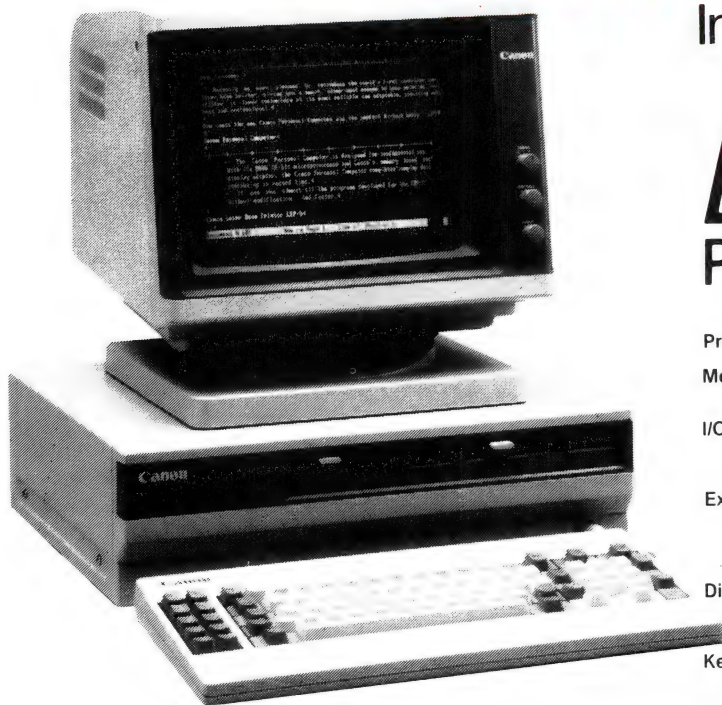
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<b>Expansion I/O slots:</b>	Total of 5. (Can be used as IBM compatible slots) 16 bit data bus slots: 2 (one occupied by display adapter) 8 bit data bus slots: 3
<b>Disk drives:</b>	Dual DS/DD 5 1/4" floppy 360Kb/disk, 80 tracks/disk 10Mb hard disk option
<b>Keyboard:</b>	83 keys, including 10 special function keys, and 10 numeric/cursor control keys
<b>Monochrome display:</b>	12" high resolution P39 green phosphor non-glare 80 characters x 25 lines 10° tilt plus swivel
<b>Colour display:</b>	12" high resolution non-glare 40/80 characters x 25 lines (16 colours) 640 x 200 pixels (black & white) 320 x 200 pixels (4 colours) Tilt angle 5°
<b>Software:</b>	MS-DOS V2 GW-BASIC V2

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# The History of Storage Devices Tape - Disks - Laser

By DAVID GRAY

---

Almost a decade ago, the cost of Winchester Disk Drives reached a level where, although expensive, most business users could take advantage of this fast and mostly reliable form of storing data.

Prior to this, half inch magnetic tape drives had been all the rage.

## ½" Tape Gives Way to Disk

In those days (it really does seem like eons ago) mainframes, such as IBM, Sperry Univac and Burroughs, ruled the roost with mini's just starting to make a strong showing, particularly in technical and tertiary environments, where the need for large storage of data was not so great.

Personal computers were a little more than a gleam in most people's eyes and it was quite improbable that they would ever use Winchester disks. Floppy was more than adequate.

## Cost of Disk Production Starts to Fall

By the late seventies, fixed disks had, through greater demand, better production techniques and newer chip technology, become less expensive to produce, by a substantial margin. However, retail prices had come

down at a much slower rate. Computer companies were able to record 66% profit (that's 200% markup) on the sale of a disk drive, and the buyer would willingly dip his hand in his pocket.

The market theories of supply and demand played a big role, but more importantly, the factor of market control prevailed.

## Mini Computers Make a Move

Only a few of the original computer manufacturers lasted the distance over the sixties and seventies. New ones emerged as the mini market developed, for example, Digital Equipment Corporation. It was at this time that a purchaser of a computer would buy most, if not all, of his immediate and subsequent peripheral needs from the original supplier/manufacturer, due to hitherto sound reasoning, i.e., maintenance and that the manufacturer must know his product best, etc. But, most importantly, there was simply a lack of alternatives.

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*David Gray is attached to the data peripherals sales team at Thorn-EMI Technology.*

## Third Party Suppliers

The "third party" supplier was to provide such alternatives and the marketplace adjusted to accommodate them, albeit with a little hesitation at first.

The main marketing concept behind selling a computer was that most manufacturers considered that, by making their CPU configurations exclusive and secretive, they would be guaranteed repeat business for all that customer's peripheral needs. But three irrevocable forces were at work that ultimately short-circuited these long-term strategies.

Firstly, it became logical and cost effective for CPU designers to use disk drives from a company that knew that business best, i.e., a disk drive manufacturer with current products and a track record in production (C.D.C. may be cited as a classic example). This had the effect of creating a virtual industry standard in disk drive technology.

Secondly, as large numbers of engineers flocked to join the booming computer industry organisations, not all their ideas could be accommodated. This led to dissatisfaction and defection; or, the ultimate trip in-



to the garage with slide rule in one hand and sweet revenge in the other.

This has two effects, cross-pollination of ideas and technology, company to company, and a multitude of interfaces, CPU's and software being designed and manufactured to be compatible with the computers of the organisation from which the engineer had recently departed in abject frustration.

## Hard Disk Market Expands

Thirdly, new disk drive manufacturers appeared on the scene hungry for a slice of this big lucrative market, all providing the industry standard interfaces — SA4000, ST506/412 and SMD. Just some of the disk drive manufacturers that easily come to mind include C.D.C., Ampex, Tandon, Shugart, Fujitsu, Hitachi, IMI and Maxtor.

Now, with a smorgasbord of disk drives to choose from and compatible controller boards to plug into most minis, the third party suppliers kicked on and, overcoming the user's fear of "the big adventure", offered peripherals at a lower price than previously experienced. This was partly due to third parties being represented by smaller organisations, typically with limited engineering and R&D facilities and, hence, less overheads.

CPU manufacturers reacted in different ways. Mainframe companies, in the main, toughed the whole show out. Others sought to hold the tide through obscure or even snappy technology. The mini companies suffered the most, and ultimately seemed content to fight low-key rearguard actions.

By now it was '79-'80. Third party supply was growing at a phenomenal rate and was here to stay. At this time, the Japanese third party manufacturers appeared with a vengeance and prices were further reduced.

The U.S., in '81-'82, proved to be a battleground for the manufacturers of larger disk drives (80-500 Mbytes). The consumer, not slow to spot an opportunity, saw to it that price

became the dominant issue and the Japanese came out of it a bit cut up but in the main quite happy with their new substantial market share.

In less than four years, ('79-'82), prices on most peripheral products had come down by more than 50%, making large storage within the reach of almost all computer users.

## ½" Tape Makes a Comeback

With disk drives now up around 700Mbytes, the problem of back-up raised its head. This had slipped quietly into the background for a number of years but now started to flex its half-inch nine-track muscles and burst out from the NRZ/PE (800 BPI/1600 BPI) shackles to show the world the GCR (6250 BPI) streamer, a virtual necessity for backing up large disks.

However, another market explosion screaming for small disks (5-80 Mbytes) and tapes was brought on by the emergence of "big blue's" heart stopping PC.

## The PC Phenomenon — Just the Start

PC's were by no means a new event, (Apple for example had been doing quite nicely for some time), but their price, performance and expandability were. Now small business houses and corporations and the main on the street could afford one or more. Some U.S. manufacturers recently recorded PC sales of almost 10,000 per month shortly after release.

Initially, U.S. and, remarkably enough, U.K. manufacturers competed for this booming 5¼" disk drive business with Japan lagging somewhat behind, although it would seem not for long.

From here, the PC disk drive market development was swift and vicious. ST506/412-SEAGATE interface became the standard, stepper motor (slow access or seek time) made way for voice coil (fast seek time) and full height made way for half height. The 80 Mbytes in a 5¼" box was broken and SEAGATE interface is giving ground to new interfaces, such

as SCSI and ESDI, and 3½" disk drives are just around the corner, with higher density than ever before imagined possible.

## 5¼" Disks — It's All Happening

The up-to-20Mbytes 5¼" disk still dominates the PC market but the manufacturers have lost most of the rough edges, so the rush is on. Super high performance, super high density disk drives are being brought up to the starting blocks in manufacturing centres in the U.S. and Asia with capacities around 200 Mbytes being claimed as the new 5¼" standard by industry gurus' observations appearing to be brought on by events other than sunstroke.

Late '83 saw a sharp nosedive in 5¼" disk prices as manufacturers sought to unload quantities of ageing technology (that can mean all of six months out of date). The price has currently stabilised, but with industry journals touting figures of US\$1,000 for over 100 Mbytes 5¼" disk drives, it seems there will be yet another price reduction.

As disk drives on PC's became larger, backing up on floppy was time consuming and cumbersome, especially in the new office or home environment where a DP department might not exist. Here the tape drive sphinxed itself from the ashes yet again, although as straight back-up of hard disk goes, the ¼" cartridge streamers are just too cost effective for the tape drive to compete.

However, as disk sizes grow, users will require a fully interchangeable medium which leads them back to ½" mag tape drives, a product that must indeed be poised for an imminent resurgence to its old days of glory.

## Today's Micro a la Yesterday's Mini

It seems that today's micro is heading for the same mountain top as yesterday's mini, with requirements for ever larger storage capacities.

Consumers are clearly showing, in this area, that manufacturers' beliefs, that micro users would be satisfied



# Hand-Held Computing Comes of Age

## ANNOUNCING THE PSION "Organiser"

Acclaimed as the world's FIRST practical pocket computer, it features innovative mass storage design techniques combined with hybrid micro-processor technology and software development.

The easy-to-use built-in database (file) in the ORGANISER allows the user to store and recall personal information such as names, addresses, telephone numbers, etc on thumb-sized solid state 8k, 16k (and soon 32k) datapaks.

These datapaks, which play the same role as disks in desktop micros, slot neatly into unique 'solid state drives' concealed under the ORGANISER'S protective sliding case, thus providing an open-ended, failsafe and ultra fast data storage and retrieval system.

Information is normally entered using the positive touch alpha numeric keyboard, and is stored as records of up to 200 characters long. These can be assessed and automatically cross-referenced using the powerful 'FIND' facility. They are displayed on the adjustable contrast full scrolling 16 character LCD screen.

A library of software is being created for the ORGANISER in the form of 16k solid state programpaks, and, currently available are paks on Finance, Mathematics, and Engineering. Since the ORGANISER uses a simple programming language (POPL), users who require programs not included in the software library can quickly and simply write, save and retrieve their own specialised programs!

From its inception, the ORGANISER was conceived as having a very wide appeal, particularly in specialist fields, for which customised data and program packs could be created and used in many different environments. (To date 125 companies in over 100 different industries, and in 12 countries, are using the ORGANISER in specialised applications and the list is still growing!)

Some of the applications include the 'MEDIPAK', a sophisticated drug database for use by General Practitioners and hospital staff; the 'WESSEX MATERIALS COMPUTER' allowing builders and quantity surveyors to record measurements and cost jobs on site; a project for Marks & Spencer Department Stores (UK) using a customised ORGANISER for point-of-sale credit card validation, and a business expense and logging system conforming to the new IRS regulations for the United States market.

PSION'S FORTH DEVELOPMENT SYSTEM (FDS) is the "key" to these specialised applications, allowing third parties to write application software and produce special databases for the ORGANISER using FORTH, a highly regarded and internationally accepted language. (FDS runs on an IBM PC and exactly emulates the function of the ORGANISER).

PSION has recently announced the development of 32k program and datapaks, a barcode reader, magnetic 'swipe' reader and software enabling the currently available RS232 Link-Up Pack (Serial communications module) to be connected to a modem for dial-up telephone communications. Last but not least, the ORGANISER is powered by a standard PP3 (9V) battery!



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with only 50 Mbytes of storage on a micro, to be totally unrealistic. Capacities of 250 Mbytes or more are being claimed by users as being only adequate, especially in the 22 bit and above micro super-micro systems. It is

interesting to note that 8" Winchester are still outselling 5¼" Winchesters. In this area, Hitachi and Fujitsu are performing exceptionally well.

### Laser Disks — Replacement for the Tape Drive on the Winchester?

The laser or optical disks currently available (in the U.S.) are for backing up the Winchester Disk. The laser effectively burns tracks onto the disk, thus allowing a write to, once only situation.

The optical disk can be used an infinite number of times to read back but is limited by its inability to record information no more than once. (More recently manufacturers have found a number of methods in laser disk technology that allows one to read and write a number of times. However this is not yet available).

This limitation is offset by the

multi-gigabyte storage capacity of the disk.

Performance such as access time and data transfer rate are marginally superior to 6250 streaming tape and substantially behind hard disk. The winning feature is simply, that in something the size of an LP record, over two gigabytes can be stored.

It's early days yet and laser disk has a long way to go, so learned claims of 70 gigabyte laser disks with Winchester Disk capabilities by 1988 could be realistic.

### Where will it all end?

As we summarise the marketplace, prices are on a downward trend. Computing power is on the increase per dollar spent. It is hard to predict more than a few years ahead as to what is going to happen, and even then it can be dangerous.

Maybe our grandchildren really will pull PC's out from cereal packets. ☐ ☐

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# THE COMDEX/SPRING REPORT

By ALBERT HADID

---

Once upon a time, 160 years ago, an Indian village called Standing Peachtree lived at the junction of Peachtree Creek and Chattahoochee River. Today that green hillock has a new name; Atlanta City, Georgia, the US South's largest centre, this year the site of the world's second largest computer products show, Comdex.

Comdex, the thrice-yearly exhibition, is an international market-place for the release of new hardware and software ideas and products. Here, 50,000 dealers, vendors, and computer magazine editors gather from places as far-flung as Australia, set on the near-impossible task of viewing 700 exhibition spaces spread out over two huge convention halls.

You'll find on average that you'll walk five kilometres a day. The Comdex newspaper seriously advises you to wear comfortable shoes with cushion insoles and darn-free 100 per cent cotton or wool socks in order to prevent blisters.

The Fall Comdex, held in Las Vegas, attracts more people than the Atlanta show; 110,000 people to double the number of exhibits. The Las Vegas Comdex was of such a size that

shuttle buses ran non-stop between the six separately located convention centres. Such is the size of the Comdex shows, that the Comdex Show newspaper printed fresh every day rivals the Sydney Morning Herald in weight at 95 tabloid pages, one third in colour.

The real role of Comdex, according to Sheldon G. Adelson, the high energy leader of the Interface Group, and major shareholder of the Comdex shows, is to help vendors "Put a product in the distribution channel overnight". The new products introduced at Comdex are 'mind-boggling', said one Australian, Lyn McDonough of PC Extras.

At the Spring show, the visitors sorted their way through 700 stands. They saw a rush of multi-user IBM AT clones, from Corona, Kaypro, ITT, NCR, Televideo, Texas Instruments, Zenith and others, showing the way for the next generation of 80286-based multi-user systems which will use graphics, windows and icons.

Other disturbing ideas such as a

cable-free microwave LAN (Local Area Network), and practical ideas like EtherMac, the device that connects the Apple Macintosh into the Ethernet standard and MacCharlie, the device that lets you play IBM software on your Macintosh, and GEM, the software that lets you play Macintosh type software on your IBM showed the trend toward integration.

A rush of new micro to mainframe link products demonstrated that the more cynical among us may start to view mainframes as simply mass storage devices for micros: for example, a Symphony Link from Lotus Corporation and Irma Link/Windows from Hayes Corporation. Lotus's Jazz, the integrated product for the Macintosh, also offers built-in DEC and IBM mainframe emulation and baud speed up to the crazy heights of 56,000 pointing the way to an ever-connecting network evolution in the 1985-86 year. Details of these and more interesting new products released at Comdex follow this introduction.

Australians such as Peter Alford, National Sales Manager of Data Peripherals, Bob Tardif, Division Custom Manager for ICL, and Lyn

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*Albert Hadid is editor of Just Computers.*





McDonough of PC Extras, go to Comdex shows to keep up with what's happening. As Mr Tardif of ICL says, "Comdex is mandatory for anyone who wants to keep pace with the developments and directions of the computer industry today." For Australians, keeping pace with international developments means watching the moves of the US market as a whole across the board. A slowing in growth for all the major US manufacturers shows that the US market maturity is not yet evident in Australia.

While all the major US manufacturers, including Apple, IBM and Wang, show slowing growth for the April and following quarter, Australian subsidiaries of such companies as Apple and IBM continue to show rising growth figures. "We've gone through the discounting phase," said Mr Adelson, of US computer dealers. "Now we've entered a new phase, with less discounting but more service." Despite the levelling of growth, the mood at the latest Comdex Show was one of optimism. Australian visitor to Comdex, Mr Peter Alford of Data Peripherals, notes that the Comdex Show has "More exhibitors than ever — it was very exciting, and definitely reflecting a feeling of con-

solidation and maturity in the industry."

### Interesting products seen at Comdex/Spring

#### Small device lets Macintosh run IBM software

MacCharlie is the name, IBM the game, for this best of all possible worlds add-on to the Macintosh that lets the Macintosh run MS-DOS software. MacCharlie is a separate hardware unit designed to co-ordinate with the Macintosh monitor, and which also adds two keyboard extensions. It works as a co-processor, and connects to the Mac by a cable. User can select PC-compatible or Macintosh modes.

Many of the Macintosh utilities, such as the Desk Top and the Clipboard will also work within the MS-DOS software. The product comes from Dayan Software.

#### And now folks, a LAN on a disk

A whole local area network on a disk; the first totally software LAN comes from the Software Link. Unlike other LANs, LANlink does not need network interface boards installed in the PC. Instead it uses RS-232 ports for all network communications. Logic that usually lives on on

network board is instead on the server and satellite diskettes.

LANlink runs all PC-DOS and many MS-DOS compatibles, according to its developers. LANlink also transforms DOS into a multi-user network.

#### Brain to brain transfer, almost

Nod, by Stride Micro, is a look no hands or feet, Ma, cursor control. You wear a small reflective device on your glasses or hat or headband, and a device on top of the terminal recognises your head movements, and positions the cursor accordingly.

It works by infra red light, and is compatible with any RS-232 input.

#### A work of genius; a cable-free FM LAN

What next? If you don't crowd the airwaves too much, you can have 255 RS-232 computers networked over a mile radius using a wireless modem. A Z80 in each modem has a one watt receiver-transmitter operating narrow band FM VHF frequencies, regardless of the serial port's transmission frequencies.

Designers, Electronic Systems Technology, encode data in HLDC format using packet radio technology. They claim error-free transmission.

Combined with a Quest portable computer it forms a portable battery-powered local area network.

#### At last the 1M-byte disk

Memory product offered included Verbatim's double-sided, double density 3.5 microdisk with a 1M-byte storage. Verbatim also announced a campaign which offered to replace any competitor's disk that loses data with a free Verbatim disk.

#### Portable computer works like a desktop PC

Datavue 25, marketed by Quadram, runs MS-DOS, includes a 360K-byte floppy drive, cordless keyboard and comes in 128K and 612K models.

#### Transmit colour video pictures by compatible

Photomail allows compatible PCs to capture images with a standard video



camera and transmit them to a remote PC via ordinary phone lines. Still frame pictures are sent at a resolution of up to 640 by 400 by 16 colours or shades of gray. Chorus Data Systems say that the system will work with any standard video camera or video cassette recorder.

## Now 4 Megabytes for Symphony and Framework

Intel, the chip-maker, gets into hardware with the AboveBoard/PC and AboveBoard/AT cards which blasts the PC-DOS memory limits, and takes Symphony V.1.1, Lotus 1-2-3, V.2.0. and Framework users four megabytes beyond the previous 640K-byte limit. An optional Intel 8087/80287 co-processor makes an IBM PC, or AT or compatible run four to five times faster.

A second release of Symphony, the integrated big-brother of Lotus 1-2-3 means 10 times bigger spreadsheets through expanded memory via the Intel-developed board. A Report-Writer for the popular Lotus 1-2-3 was also introduced by Lotus at the same time as the AboveBoard Symphony upgrade.

## The long-awaited Jazz

Jazz, the Lotus Corporation five-function integrated package for the Macintosh was picked six months ago as the key to Macintosh sales. Released finally too late to have a marked effect on Macintosh, the easy to use Jazz offers an unusual feature. This special feature will provide a strong selling point for Jazz; it means that users can update completed reports from any of the modules.

For example, if a report is a letter containing spreadsheet calculations and graphs, then that report can be updated from the original worksheet or from the graphics module. No cutting and pasting is needed, the report updates immediately directly from the original reference material. Jazz leans heavily on Microsoft design principles in the way it works. The WP works like MacWrite, and the graphics unit feels like Microsoft Chart. Jazz will compete with the yet to be released Microsoft Excell, a similar integrated product for the Macintosh.



Jazz comes with extensive communications including IBM and DEC mainframe emulation. It will retail in Australia at A\$895.

## Macuggage and other gadgetry

Macinware navy blue luggage holds the entire Macintosh system complete with disk drive and keyboard. Another bag holds the 80 column ImageWriter.

T-Shirt Factory lets users make iron-on transfers from the ImageWriter printout. You do this by changing the ribbon. The kit includes six colour ribbons.

ColorPrint software prints up to eight individual colours and more in combinations on the ImageWriter.

## Board chops network costs; runs eight terminals off one PC

The Com-8 board is a programmable, multi-channel board which runs on PC compatibles and allows a micro to support as many terminals as its memory will allow.

It adds individually addressable RS-232 asynchronous ports to micros. If linked together, the boards allow the micro to run multiple terminal for an Australian estimated cost of A\$1200.

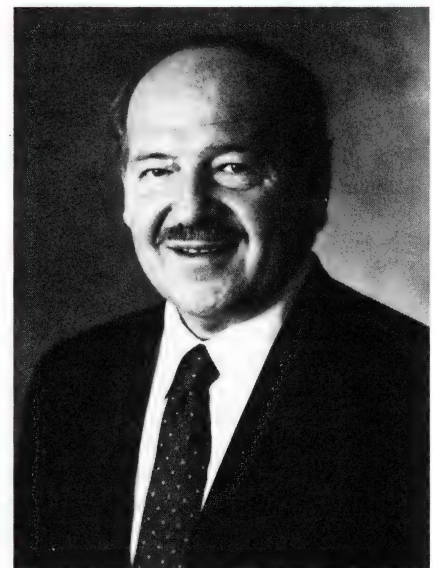
The COM-4 runs four terminals for about half the cost of COM-8.

## Run 64 barcode guns off one PC

The Scan-Net system offers barcode light-pen guns that read labels from a one foot distance. The package consists of 64 light pens, software and a multiplexor. The light pens have 20 character LCDs and will read plastic covered labels and labels on uneven surfaces.

## Add four ports to your AT

The Quadram Quad-Port AT gives an AT a parallel printer port and a



**SHELDON G. ADELSON**  
President, The Interface Group, Inc.





serial port at a lower cost than IBM's own Serial/Parallel adapter. An expansion kit lets you expand the AT serial ports by four.

#### DEC PDP11 and IBM PC connection

DEC launched a link between IBM PC and compatibles and its Micro PDP11 PC running type A-Z software family.

#### Throw away your keyboard: OCR for Mac and IBM

A low cost optical character reader for the IBM and Macintosh includes an RS-232 connector cable and software and comes with a start-up interface unit and training materials from Oberon International.

#### The 5.25 100 M-byte optical disk attachment for your PC

Information Storage Inc. introduced an optical disk system which they claim is the first read/write attachable optical storage system. The new system fits the desktop footprint as traditional mass storage drives. The SuperStore 2000 disks will cost around A\$120 in Australia. The 100 M-byte system includes the ISI 525 WC optical disk drive, two SuperStore 2000 optical media carriages, a PC/525 Systems Software package,

cabinet with power supply, interface cable and documentation.

Performance is reportedly similar or better than existing fixed drive systems for PCs.

#### Text-squishing card sends 5000 ch/sec

A plug-in card for PC compatibles speeds telecommunications up to four times to 9600 baud rate when used

with virtually any modem, says the board developer, Datran, of their Modem Accelerator Multifunction Card. The Card compresses English-language text and other ASCII data by a factor of 3:1 or 4:1.

Software bundled with the system controls disk compression, telecommunications and spell checking.

#### Continuous speech recognition for data input

Verbex offered Voice-Planning software, a programming tool that runs PCs and minis. This lets users develop custom vocabularies for the Verbex speech recogniser. The system claims to allow users to "accurately enter data and commands in a natural stream of words, numbers and phrases without artificial pauses."

The Verbex Series 4000 consists of a voice recogniser and the voice-planning software and adds voice entry to keyboard operation.

#### Dvorak keyboard for PC compatibles

A low cost Dvorak keyboard in IBM beige with tactile keys could speed operator input, suggests Maxi-Switch Co. The keyboard comes with ergonomic extras; a palm-rest, and adjustable legs.

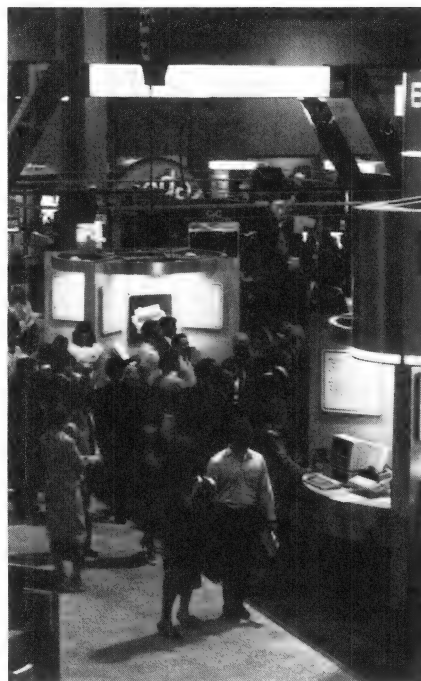
#### MS-NET Lan supports 32 Apricots

The Point-32 LAN (local area network) supports PC compatibles or Apricots.

Based on Microsoft's MS-NET, Point 32 networks all Apricot models, plus the IBM PC.

#### One M-Byte Apricot has iconised desktop

Apricot introduced its new Xi-20, an MS-DOS micro which addresses the 1M-byte limit of the 8086. It comes with a 20M-byte hard disk and has an iconised entry level based on Digital Research's GEM. Called Activity, the icon system protects users from DOS complexities. □ □ □ □



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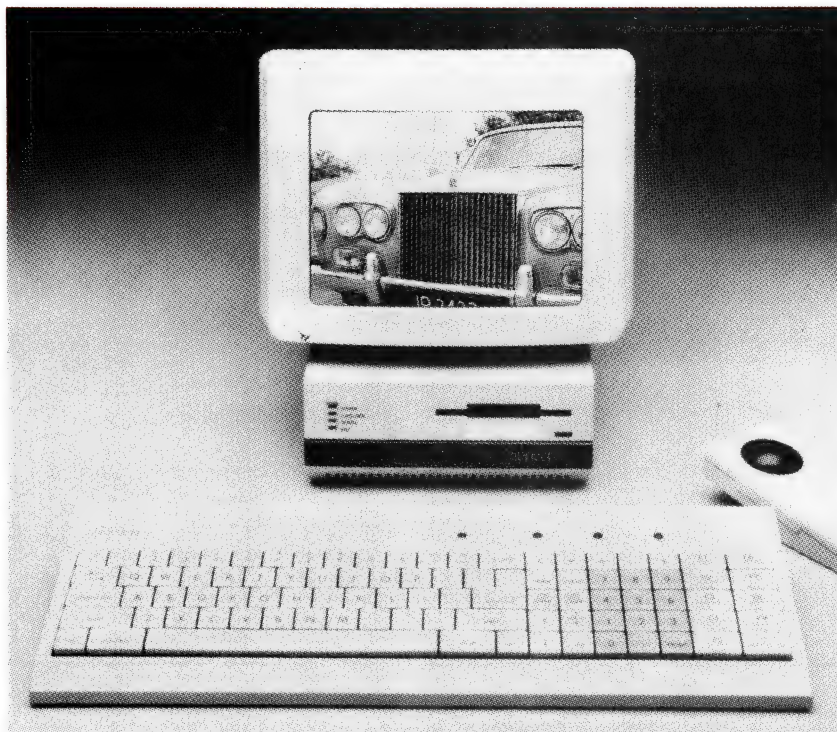
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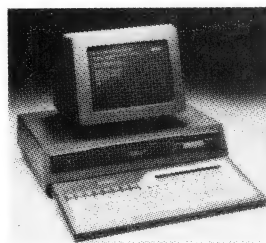


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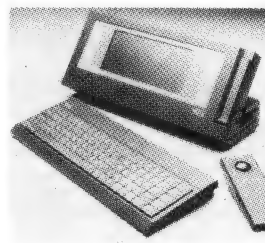
The F1 has been specifically designed for the first-time business user—the person whose first computer investment must represent a genuine business machine. With features including a standard 256k of RAM (expandable to 768k), double-sided 3.5" disk drive, cordless infra-red keyboard and optional mouse, and colour electronics enabling the F1 to display colour on a wide variety of monitors, it sets a new standard in entry-level business computing.



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# N.E.W Z.E.A.L.A.N.D L.E.T.T.E.R.S T.O T.H.E E.D.I.T.O.R

Dear Sir,

I have just purchased your first issue, and I wanted to congratulate you on a publication that really fills a gap in the New Zealand computer scene. Too often New Zealand computer magazines are just a series of review of new hardware, and when I see an advertisement for the same hardware right beside the review I find my faith in the reviewer's impartiality slips a bit.

For some years I have been buying Byte magazine, and just this month I cancelled my order; when it went over NZ\$10 a month, I felt that, excellent though it was, I couldn't justify the outlay on a magazine that was increasingly leaving behind my area of interest. You see, I followed Jerry Pournelle's advice, and bought a Kaypro 2, only to find that within a year Byte had forgotten all about the numbers of us out there in the 8-bit CP/M sphere. I am pleased to see that although you are up with the latest developments, you haven't gone IBM and Macintosh mad, and that someone realises that, for most of us, an 8-bit machine is entirely suitable.

My other reason for writing is to see if you are interested in editorial material from this end of the country. I am a secondary teacher, teaching computing, Social Studies, and English. I could contribute material on our fledgling efforts in introducing computers in our school, and our night classes which we run to introduce local people to computers. At present we teach a beginners' course to 11 and 12 year

olds, using Logo and a bit of Basic, and a sixth form course. I know that we are probably a long way behind many big city schools in these areas, but that in itself points out some of the problems that are occurring in computer education in this country; how do you develop worthwhile courses when the nearest computer shop and advice are 270 km away?

I feel strongly that communications will open up the opportunities to join in the revolution that is happening throughout the country. When people in remote areas can communicate easily with those in Auckland, many barriers to the spread of knowledge will fall, and computers have the possibility for increasing true interaction between New Zealanders. I am thinking seriously of getting a modem for my Kaypro, and I would relish the chance to report as a guinea-pig for such equipment and the services that are developing. Certainly, I would like to see more information on how these bulletin boards and other services are being used.

In the meantime, good luck with your magazine, which contains so much useful information.

GREGOR RONALD  
225 Beacon Point Road,  
Wanaka, New Zealand

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F.O.H.

Dear Sir,

The SORD User Group in New Zealand has been collecting material about SORD Computers for some time. Most of the material is about the M23, PIPS 3 and SORD Basic. The information has gone mainly to dealers, and little has reached users. There are difficulties of time and money in contacting users. Past newsletters and meetings do not seem to have met this need fully.

So, onto a new idea of sending an index of the material available and then sending copies to any who want to send in their cheques. There is no charge for any SORD owner to be on the mailing list (please advise of any users who would like to have their names added to it).

The information will be sold at a cost of NZ\$25.00 for 50 pages with index of material, and copies will be supplied two to four weeks after ordering. The index to the first collection of information is available and further indexes are now being prepared.

I am a user of SORD equipment and not a dealer, so my aim is to get

information from all available places and send it to other users.

Graeme Hall  
P.O. Box 391,  
Manurewa 1702  
New Zealand.

Dear Sir,

We are the Tandy franchisers for the lower part of the North Island and all of the South Island. Currently we are considering advertising in 'Just Computers'.

We were rather disturbed to read on p.149 of your June issue, that Computer Advances Ltd is the New Zealand master distributor. This is not the case. They merely hold the franchise for the remaining portion of New Zealand which they share with Porterfield Computers Ltd of Auckland.

It would be much appreciated if this error could be rectified by you at the earliest opportunity.

Also, the comment by the reviewer regarding the F11 and F12 keys with SYBIZ; this has not been the case with the version of SYBIZ we sell.

Looking forward to reading this correction in your next issue.

JOHN MCPHEE  
Marketing & Sales Manager  
A.V.M. Electronic Group Ltd  
Tandy Division  
149 Hereford St.,  
Christchurch.

Dear John,

*We hasten to correct the inadvertent error of our reviewer. Please accept our apologies.*

F.O.H.



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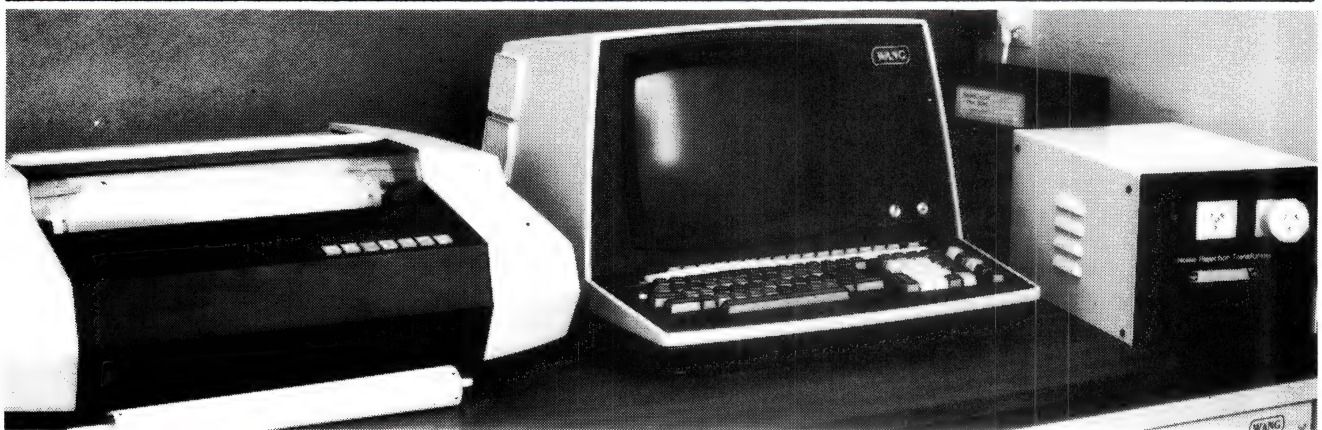
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<b>Typical Causes</b>	SCR's firing, welders, ignitors, switching for load or power factor correction, fault clearing...	Load switching on/off such as air conditioners, machine shops, transformers, ovens...	Momentary line fault, utility switching operations...	Brownouts and other power cut-backs due to shortages, daily demand fluctuations, long line regulation problem...	Lightning, impulse noise, grounding faults, poor grounding practices, radio transmitters...
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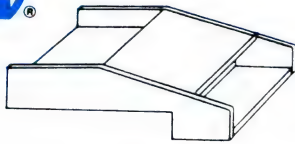
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**RATIO:** Can be designed to meet any input and output requirement. No additional transformer required.  
**SUPPLY:** 1 phase or 3 phase



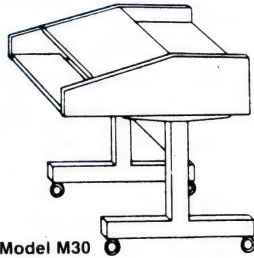
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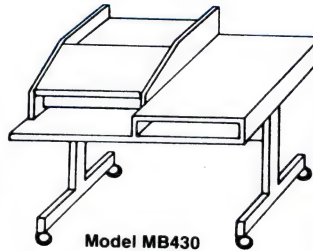
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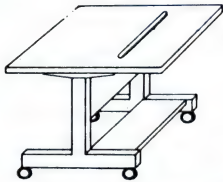
Model S30-4



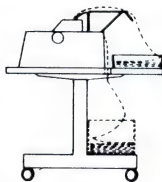
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INQUIRY 95



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AUGUST 1985 • JUST COMPUTERS 117



## INCREASING POWER OF TECHNICAL COMPUTING

A new Auckland based computer company which specialises in high technology computing, is offering New Zealand engineers, architects and business people access to the world's largest computers, and some of the most advanced technical and business programs available.

The company is Matrix Computing and Consulting Limited and managing director Kevin Stanley says it is able to offer the programs, the computing

power and the expertise to handle virtually any technical problem or do any analysis which an engineer or business person may require, from the design of highways and railways or three dimensional static analysis, to providing financial planning and spread sheet programs and microcomputers for small businesses.

Mr Stanley says the company can offer engineers and business people who have their own desk top personal computers, more technical computing power at their fingertips than is available to any

New Zealand organisation on its own computer.

"We are able to offer this capability through Control Data Corporation's Cybernet worldwide remote computing service, which we took over in New Zealand just before Christmas," he says. "Through Cybernet we can offer access to some of the world's most powerful computers such as a Cyber 205 super computer in Brussels."

The company will offer a wide range of computing services, hardware, software and consulting services, based on technical engineering requirements,

operations research, financial modelling and other management sciences.

"While Cybernet is just one aspect of our business, we expect it will be a major part with another major portion being a new computer aided design system, the Artech CAD system from SKOK in the U.S., which has been a major success overseas and which we are introducing to New Zealand. The product runs on Hewlett Packard HP200 microcomputers, and it offers many advantages over similarly priced products.

"One of the major benefits is that it is a true CAD system — it fits between micro programs which are really only drawing systems, and the major CAD/CAM systems which are total all embracing packages needing a substantially larger computer."

Mr Stanley says one of the directors of Matrix, Don Campbell who holds a PhD in engineering and is a registered engineer, has extensive experience in the area, having spent 12 months in a Canadian research centre working on CAD. The company will be making available for microcomputers versions of many of the complex programs now available on Cybernet. These include programs such as structural analysis, project management and one of the most used financial modelling programs in the world, the IFPS or Interactive Financial Planning System.

Matrix will be offering the Zenith microcomputer, a 16 bit MS-DOS IBM compatible PC, available in



*The Directors of Matrix Computing and Consulting Limited. Back row from left: Don Campbell, Glen Harvey, Paul Denton; Front: Kevin Stanley.*



both desktop and portable versions. The Zenith Z150 was recently adopted as the standard machine for the U.S. Air Force and more than 10,000 high security versions have been ordered by the U.S. Defence Department at a total cost of US\$100 million. This is the machine used by Control Data Corporation for its highly successful education and intelligent terminal applications around the world.

Mr Stanley says a wide range of technical and advanced business software is available for the Zenith, along with a communications package, giving the machine the ability to act as a Cybernet terminal.

Matrix Computing and Consulting Limited has an established client list including major New Zealand companies such as New Zealand Steel and Fletcher Challenge, a number of government departments, and many of the major consulting engineers. Among the major tasks the company has been involved with to date, has been a major design analysis for the electrification of the main trunk railway, an evaluation of the proposed Aromoana aluminium smelter, and a financial model of the entire New Zealand Steel Development Project using the IFPS financial modelling package.

Mr Stanley says the company intends to install its own scientific super-mini computer in its new Greenlane offices later this year. "This machine will offer New Zealand-based access to a number of the programs currently available

on Cybernet, and to a number of programs which aren't on Cybernet but which will be appropriate to New Zealand businesses. The new computer will run scientific type programs rather than transaction type processing, and it will offer access to large numbers of terminals and large numbers of remote users," he said. A final decision on the type of computer the company will purchase will be made shortly.

Matrix Computing and Consulting aims to provide the broadest possible base of technical computing for the New Zealand marketplace, and to provide industry with a wider range of technical computing applications. Mr Stanley says Matrix is already the largest engineering and management sciences bureau in the country, a position the company intends to maintain. "We're looking to continue to be the market leader in technical computing services, and we intend also to be dominant in CAD/CAM areas. We're already a major supplier of software and hardware to the engineering profession and we intend to

maintain and build on that position."

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## COMPUTER LABELS

Avery Labels (N.Z.) Limited have announced an alteration to their marketing policy with respect to Tabulabel Products.

Tabulabel Products — the original self adhesive computer labels — are no longer available from only one business form manufacturer, but can now be purchased from a variety of outlets.

INQUIRY 122

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## SOFTWARE DEAL WITH NEW ZEALAND

Australian business software company PowerCorp Pty Ltd has closed what is believed to be one of the biggest ever export sales of Australian developed software. The A\$1 million contract, which ensures a minimum purchase level of 250 units of Power Software a year, also provides the right for the similarly

named New Zealand company Software Power Ltd to produce the disks and support documentation in Wellington.

Speaking from Wellington, David Rogers of Software Power said the Australian product was far superior to the packages that had previously been dominating the New Zealand market and he was confident his company would achieve a 20% share of the market within the first 12 months. "Apart from the four standard accounting packages, the Power product has an extremely easy to use configuration module, which enables each dealer to quickly configure screens and reporting dates to suit the internal needs of each individual business," said David Rogers.

PowerCorp Pty Ltd acquired the marketing rights for the Australian-written Power Software in Australia and New Zealand just over a year ago. The company spent the first six months polishing the packages and preparing comprehensive user manuals

INQUIRY 131

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## COMPUTERS & PRINTERS

Recently in New Zealand, new computer products from Canon were released, reflecting their increasing strength in the field of office automation and technology, with emphasis on integration and user orientated design.

The first product announced was the A-200 microcomputer for the first time user or corporate executive. This fully IBM PC compatible microcomputer is competitively priced (from NZ\$6,700 tax paid — including MS-DOS and GW BASIC) and software options can be added. These include any IBM PC compatible software and the Canon Data Products Total Responsibility Package of full customer services.

Other new products are the TX-50 applications computer for specialist/-counter top systems and the HT5000P (The Handy Terminal), an intelligent portable hand held terminal for field users.

The new high technology printers announced will create much interest. There is a range of four technologies. The dot matrix impact printers are more competitive, with new letter quality performance, for high speed printing at a reasonable price. Thermal transfer printers are now available for crisp printing on plain paper, and, for brilliant business graphics, Canon has new colour ink-jet models. Most interest will be in the new laser beam printers for professional high speed quality printing. Already other

leading computer companies have chosen these to supplement their offerings.

### Flagship Launched

Of greatest impact will be the new AS-300 multi-function computer. Announced as a high-tech product, the AS-300 has a technical specification to match the latest leading products from overseas. Based on the Intel 80186 processor chip, Canon has added its own custom LSI bit mover for fast high resolution graphics.

Vertical as well as horizontal monochrome (12 inch — 768 x 540 pixels, 15 inch — 1088 x 756 pixels) VDU display for full screen word processing, and high quality colour screens are available. Memory starts at 256Kb and is expandable to 768Kb. Disk storage ranges from new 3.5 inch (760Kb) drives in multiples of one, two or three through to 5¼ or eight inch floppy disk drives. Hard disk is available at 10Mb or a massive 40Mb. Other hardware features include a range of expansion and communications options to provide, asynchronous (RS232), bisynchronous (SDLC), and local area networking (L5-LAN). The multifunction options of the AS-300 are seen as — an intelligent terminal, a word processing system, a personal computer, a network computer, or a small business system.

Software for the MS-DOS based AS-300 includes CanoWriter, rated as one of the best word processing packages available, and

CanoBrain spreadsheet information system. However, the new Canon integrated productivity package called Super CanoBrain will attract most attention in the industry. Using the fast processor and new graphics technology, this package incorporates many of the individual outstanding features of the other vendors' products integrated into one package. Super CanoBrain has icon menu selection, with or without a mouse pointing device, multi-windowing, integrated graphics, word processing, spreadsheet and information handling. Extra functions such as draw, cut and paste have been added to make Super CanoBrain an outstanding high productivity tool. The AS-300 will be priced from around NZ\$7,800.

INQUIRY 123

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## COMPUTER COMMUNICATIONS VIA THE AIRWAVES

Computer buffs can now receive new software programs via commercial radio. Dick Smith Electronics in conjunction with Radio New Zealand, are pioneering this venture — the first commercial application of its kind in the Southern Hemisphere — on 26 radio stations across New Zealand.

The General Manager of Dick Smith Electronics in New Zealand, John Gourley, said, "This new concept means that computer programs will be available FREE for transfer from

cassette to cassette via the airwaves.

Radio New Zealand's "Tonight Show" producer, Maureen Sinton, feels that it is important that radio reflects the interest in computers. "The Tonight Show will offer a nationwide Computer Club with computer news and an on-going competition," she said.

The radio programs on computer are being broadcast on Monday and Tuesday evenings, and the Telesoftware broadcast goes out in the form of audio tones at 3.30 on Wednesday mornings.

This selected computer program becomes the winning entry of the week, and receives a NZ\$100 prize from Dick Smith Electronics.

The company also provides two overall annual prizes. The "Computer Educator of the Year" award aims to encourage the use and understanding of computers in education, and the winners receive cash prizes of NZ\$2,000 and NZ\$3,000 worth of equipment. An equivalent prize is offered to the best of the year's weekly winners.

Computer Club members will also be kept up-to-date on computer trends, via a quarterly newsletter. The early Wednesday morning computer programs can be recorded on standard audio cassettes.

Dick Smith is negotiating a similar concept with radio networks in Australia, and also in the United States where the company has recently established operations.

INQUIRY 124

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## MAINFRAMES CATCH UP WITH MICROS

Mainframes have caught up with micros by providing truly integrated spreadsheet and personal data base software for managers' and professionals' use, according to Doug Barr, National Marketing Manager at Data General New Zealand.

Larger systems running sophisticated decision support software now offer end users more cost effective and integrated tools. Decision support can be thought of as the mathematical and graphics part of business automation. When speaking of decision support, many different terms are used — such as, spreadsheets, data analysis, forecasting, budgeting, planning, and reporting. All these terms refer to decision support.

According to a recent survey conducted by the Omni Group Limited, a major U.S. consulting firm, decision support is by far the most important application of office systems among managers and professionals.

In the recent past, resistance to office automation has arisen, in part, from the failure of available products to capture and facilitate the office process adequately. Most computer manufacturers implement functions individually. Data General has overcome this problem through its

philosophy that a user should be able to move from one task to another by merely striking one function key.

Today's users are looking for solutions that maximise productivity through integrated products which allow them to concentrate on features, not keyboard commands. They need to be able to communicate easily using electronic mail as a medium. They need electronic spreadsheet support, graphics support, access to production data, a report writer for inquiry purposes and graphics production, filing integration, on-line intelligent help and function key integration to obtain maximum benefits from a system.

Until recently, micros have "bridged the gap" by supporting spreadsheet processing with graphics facilities. Micro-based personal data base/data tables are available which facilitate data extraction and manipulation, but lack of integration with other software packages has made learning slower, and has provided personal computing functionality only.

Users can range from the casual to the sophisticated, but regardless of any individual's level of expertise, all will need to access and use many different system functions. To this end, users are looking for functional integration — i.e., the same editing standards and conventions system-wide using the same function keys, e.g., find, copy, move, insert, delete, etc.

Functional integration of spreadsheet and database software means that new users learn rapidly and the system shows early benefits in cost reduction, cost elimination and enhanced productivity. Existing users see concepts with which they are already familiar in the new facilities. Productivity gains are realised without a long learning curve. The ability to create a personal data table from a corporate production data base, gives users greater flexibility when manipulating data. All these features are now readily available in a multi-user office environment. This overcomes a weakness commonly associated with a micro-based user environment — the complexities surrounding system operation which often arise when trying to obtain and manipulate corporate data held on mainframes via a micro.

Whilst most vendors clamour to bring some form of integration to the end user, Data General already delivers a comprehensive solution in integrated business automation for people with all levels of computer skills. Data General's new CEO Decision Base software is providing managers and professionals with a single tool, on a single terminal, for all aspects of their job.

CEO Decision Base is not just another spreadsheet tool. It consists of a number of components allowing managers and professionals to create massive spreadsheets — 9,999 rows by 999 columns. The data

table feature allows data to be extracted, summarised and displayed on a terminal from any production data base held on a networked or single mainframe. The user can copy the data table into a spreadsheet, or produce reports or graphs using integrated reporting and charting facilities.

Personal data base/data tables provide all the functionality commonly found in most personal data base products available on P.C.'s. The unique feature is the integration of this software with a full business automation package which is available on any size system in the Data General product range.

PRESENT, another element of Data General's CEO product, integrates an "intelligent" data selection capability with powerful manipulation and formatting on information maintained on files and data bases. With PRESENT, managers and professionals can collect and manipulate raw data and turn it into concise, useful information.

The best business automation solutions are those flexible enough to deliver to every person in the office, all functions from one workstation on their desk, which can be serviced by small desktop systems through to superminicomputers.

INQUIRY 125

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## SOUTH PACIFIC CONFERENCE

The Tandy Corporation recently held their spring conference in the unlikely setting of the Phillipines. Manila played host to the 'spring' conference of the largest retailer in the world, lending a certain irony to the event, with this high technology American giant using the facilities of a country which has 75% of its population below the poverty level. Of more concern to dealers and their hosts was the extremely volatile nature of the host country and the generally unstable politics therein, which had resulted in eight of the major hotels being firebombed in the two weeks preceding the convention.

One of the major points to arise from the conference was the Tandy Corporation's stated intention of developing the offshore market with renewed vigour. Tandy now has over 8,000 outlets in the United States and more than 1,100 of these are exclusively computer centres, the upshot of which is that, having effectively saturated the American market, new trading fields are now being actively sought. Australia already has in excess of 350 electronic and computer stores, which is some indication of the degree of success which we can expect to see from this range of computers in New Zealand.

Tandy are currently represented by an Auckland based company, Computer Advances Ltd., who have their own dealer network throughout the country and look poised for a good year

with a strong range of computers already making considerable impact. The latest addition to the fold, the Tandy 1000, continues to draw enthusiastic reviews from overseas and local reviewers alike.

Managing Director, Mr Keith Redit, says, "We looked very hard at Tandy and their range of products before setting up Computer Advances to handle their computers exclusively. We bring nine different models into New Zealand, allowing us to cover any requirements from domestic, through to desktop PC, right up to the world's leading multi user Xenix machine. With over 3,000 existing Tandy users in New Zealand, we already have a considerable client base and the number of large companies that have early Tandy computers still in constant use is providing us with an unending source of customers already well aware of the quality of our machines."

Also of interest at the conference was the continued effort by Tandy to improve an already world-beating product, the Tandy 6000. This multi user Xenix power house was previously more than capable of giving the AT a run for its money, in the guise of the "16B" with the 68000 processor + Z80 I/O handler. The Yates report rated this machine with the most popular, having 35% of the U.S. Unix/Xenix base, and it now boasts a 100% + increase in speed and up to six user capability.

With the standard of computer that Tandy has in



*Keith Redit, Managing Director, Computer Advances Ltd.*

the current range and their competitive pricing, coupled with a very real determination on behalf of the parent corporation to establish itself in the South Pacific, Tandy Computers will consider Computer Advances as host for their next round of overseas conventions.

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## INFORMATION TECHNOLOGY WEEK

A week dedicated to increase the awareness of information technology will be held throughout New Zealand from 17-25 August.

Information Technology Week is a joint activity organised by the New Zealand Computer Society and the New Zealand Technology Advancement Trust. "Both organisations recognise the vital part information technology will play in our country's future. It is important that our industries are made

aware of the benefits of using information technology in their business ventures. Unless we take advantage of its possibilities, New Zealand's position in the competitive world will be seriously eroded," said Dr Colin Boswell, President, New Zealand Computer Society.

The program planned for the week includes public demonstrations of the machinery used to produce information technology, exhibitions of computers and open days where the public can see examples of advanced technology actually in use. There will be visits to schools and at business gatherings by leaders in the field of information technology, and many other events — all designed to develop the awareness of information technology.

Information Technology Week coincides with the Silver Jubilee celebrations of the New Zealand Computer Society, who will be holding their biennial conference in Auckland in the following week.

Other major organisations are also supporting the project. They include the Computer and Office Products Industry Federation (COPIF), The New Zealand Computing Services Association (NZCSA), National Electronics Development Association (NEDA), the Department of Education, the Department of Scientific and Industrial Research (DSIR) and the New Zealand Post Office.

INQUIRY 127

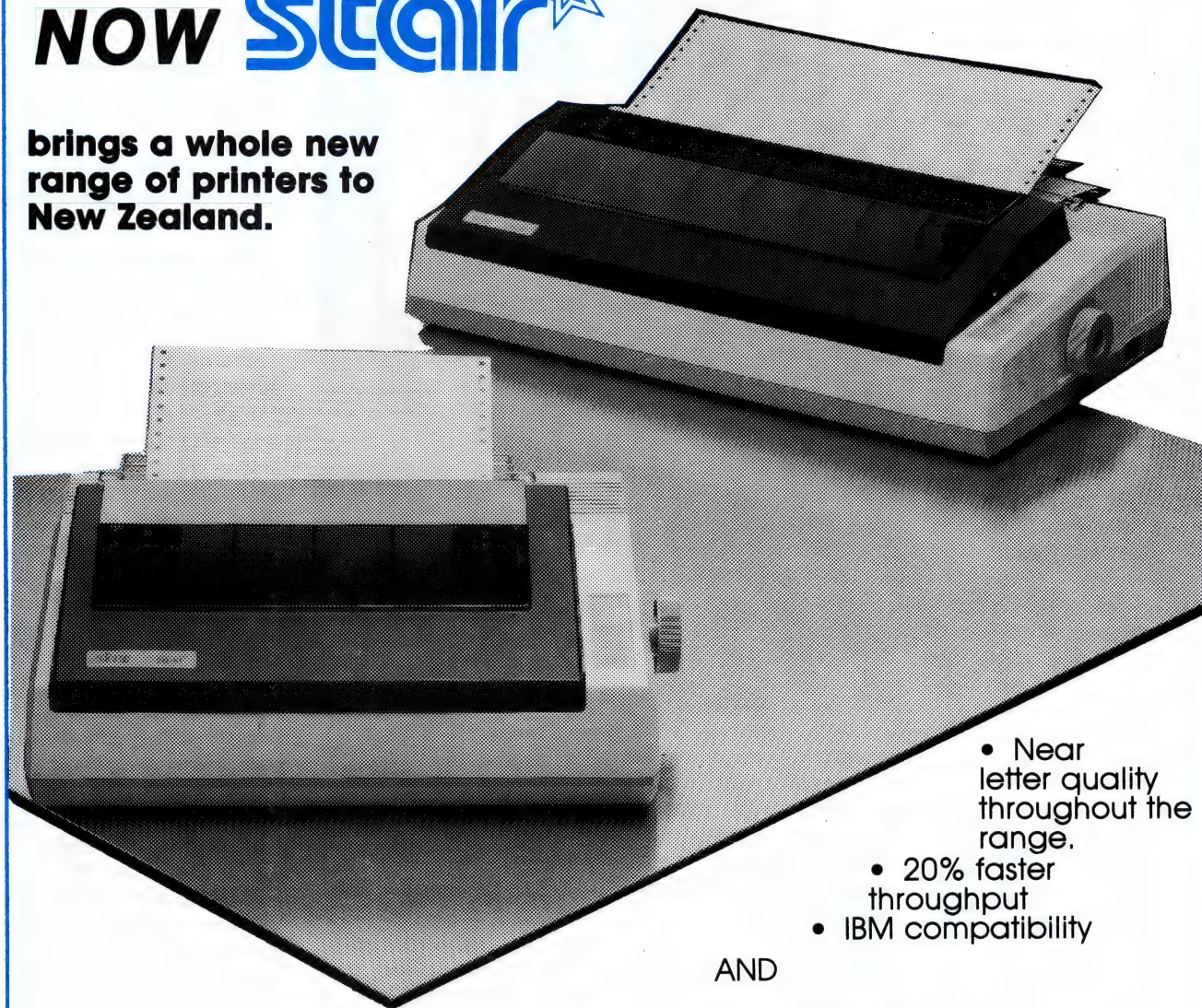
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## COMPUTER LAUNCH WINS PR AWARD

Last year's public relations program by Philips New Zealand Ltd. to launch their P2000C microcomputer has won for the company a Cherrington Award for excellence in public relations.

The P2000C launch program was named outstanding PR project in the marketing category — one of four categories in the Awards, which are sponsored annually by the Public Relations Institution of New Zealand. The award was announced at the recent Public Relations Institute conference in Rotorua.

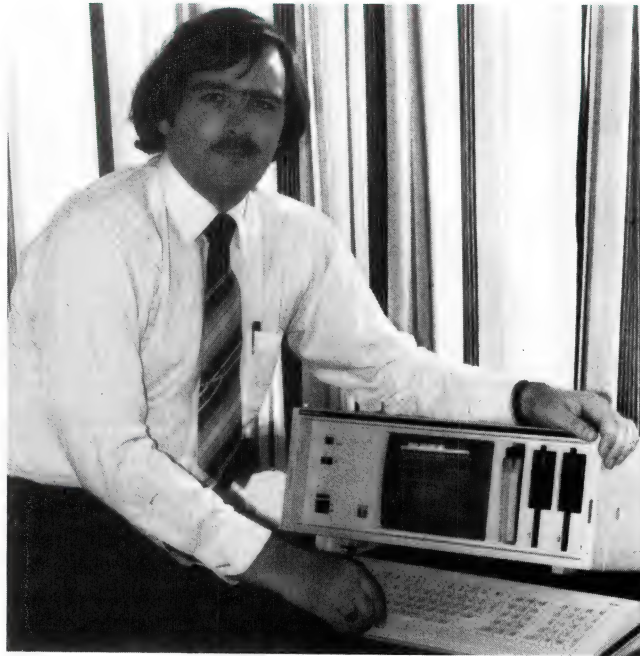
Corporate Public Relations Manager for Philips, Mr Mike Maryan, says the award recognises the importance of PR to the marketing of a new product, especially in the computer field.

"Our program not only had to inform potential customers of the new micro, but also establish the company's expertise in office automation," he says. "We thus had a dual problem which we managed to solve by careful use of public relations techniques. We were helped to a considerable extent by having a competitive product upon which to work."

"Our company places great importance on the value of public relations and its aim of creating understanding through the communication of knowledge."

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*Mike Maryan of Philips*

## OFFICE AUTOMATION PRINCIPLES

"Office automation can only work when you get top management to use computers," says Mr Mal Thompson, the general manager for C.E.D. Limited, the sole distributors for Apple computers in New Zealand.

Management is very competitive, and few managers are prepared to admit that they don't feel comfortable with a computer. As a consequence, many businesses, which have invested in office automation, have recorded productivity increases well below that which was expected. To be blunt, the only solution is to install computers that people will actually use," he said.

Mr Thompson pointed out that most computer companies are still stressing the power of their computers, instead of their ability to fit into a real life office

situation. Although the Apple Macintosh — their target machine for the office automation market — uses an ultra modern 32 bit processor, he says that its main emphasis is on providing powerful, but comfortable, computing, rather than just power.

Very few people, other than secretaries, have typing skills within an office environment, and this alone is a major barrier to the use of computers.

"If you think back, typing was a skill taught to many teenage girls so that they could become receptionists," said Mr Thompson. "Every computer except the Macintosh requires a high degree of typing skill, which most executives don't have and many consider demeaning to learn."

He claimed that in many instances Apples's unique 'mouse' technology, which enables a person to use the Macintosh computer using

the keyboard only to feed in the initial data, completely breaks down the barrier between humans and computers and provides managers with powerful and efficient productivity tools. He said that almost every computer company now recognised the value of the 'mouse' technology and added that even IBM had mice for the PC, which he regards as a glowing compliment. "However," he says, "their mouse is an afterthought and does not really work well. Apple designed the Macintosh to work with a mouse right from scratch. There are also complete office networks, high output printers, electronic mail and 'a host' of other office automation options. Apple are developing the technology which allows the Macintosh to share an office network with existing IBM PC's and to communicate comfortably with most 'Mainframe' computers, including IBM's."

Mr Thompson said that had Apple not provided the business community with practical but simple business solutions "There would have been no personal computer revolution. Every major event in the personal computer industry has been, or is, a response to what Apple does." He acknowledged that it was easy to make these claims, but said "I'm not asking you to take my word for it — people should go and try out a Macintosh for themselves, and then they'll find out just how successful office automation really can be."

INQUIRY 129

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## SCROLL

'SCROLL' is a bible research program designed to run on the BBC micro-computer. It very rapidly searches through the text of the King James Version New Testament, looking for a match for words or phrases specified by the user. The verse reference or the whole text of the "Verse containing a Match" for these word(s) or phrase(s) is held on an output disk for later analysis by a word processor program. 'Scroll' is like an exhaustive bible concordance with these extra capabilities and features:

(1) Rapid Searching of Text for specified words or phrases:

Up to four independent words or phrases can be researched simultaneously by the program. This permits related subjects to be researched in parallel, and reduces overall search time, drive wear, and disk wear.

(2) Saving of Verses Found on disk:

The ability to pool the whole text of each verse found on an output disk, is a unique and distinguishing feature of this program.

(3) Production of a Verse Index on disk:

If the user prefers, an index of verse references can be produced on the output disk, rather than saving the whole text of each verse found in the search. This has the advantage that approximately only 10% of the disk space is required, compared to the saving of whole verse texts.

(4) Searching between Limits:

Frequently, a user wishes to research only a selected portion of Bible text. Accordingly, a facility is included in Scroll which permits limits to be set to the search commence and finish points.

(5) Editing of Verses Found with a commercial word processor:

This feature is extremely powerful and is believed to be unique to this program.

As the Bible text included with this program has been typed into the computer using 'VIEW' word processor, all output from the program is fully compatible with 'VIEW'. This word processor may be used to great effect in formatting, editing, collating, or rearranging the verses found.

(6) Direct Access to the Bible Text held on disk:

Using VIEW word processor, the blocks of Bible text held on the program disk can be directly accessed by the user. Portions of this text may be retrieved, printed and edited by the user as required.

BBC model B micro-computer is required, as well as operating system 1.2 (standard with disk upgrade), Acorn disk filing system (Version 0.9E or later), and dual double-sided 80 track disk drives.

Preferred additions are 'VIEW' or 'WORD-WISE' word processor, and a printer — dot matrix or daisywheel.

Price of 'Scroll' - retail price NZ\$350.00.

INQUIRY 130

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## N.Z. EXPORT SUCCESS

Datacom Group anticipates export revenue of NZ\$2.25 million from Japan and the United States over the next 12 months. This is the value placed on forward orders for its unique field data collection system, the SDR2 (Sokkisha Data Recorder) developed for the international surveying industry. Sokkisha of Japan and its American subsidiary, Leitz Company of Kansas, have placed a combined order for 1000 units.

The success of the SDR2 and its prototype, the SDR1, which has already sold successfully in Japan, Australia and New Zealand, arises from the fact that it allows survey calculations to be made in the field, and in addition, provides instant verification of data. Datacom Product Manager, Alan Townsend, who has spent the past year based in the USA with Leitz, will now assist Sokkisha to launch the SDR2 in Europe and the Middle East. He will conduct advanced training sessions in Stockholm and Athens.

A software product, developed by Datacom's R&D team in Christchurch, the SDR2 runs on MSI hand-held computers from MSI Corporation, Costa Mesa, California. The miniaturised interface which connects the portable data recorder to survey instruments, was a further technological modification designed by Datacom Equipment, the datacommunications arm of the Group. In field tests conducted by independent sources in the United

States, the SDR2 has outperformed all competitors on the market. Typical are the findings of a six month evaluation of alternative data collection systems conducted by "Foresight", a magazine catering to the surveying, mapping and engineering industries.

The SDR2 was rated "the best overall field computer/data collector". At the same time it was acknowledged that the "overall capabilities of the SDR2 were so vast and the unit so flexible" it was not possible to test all its capabilities. It was the "only data collector that could calculate with precision in the field," wrote "Foresight". "We were also able to print out raw field notes and xyz co-ordinates directly to a printer without the aid of a computer. This was outstanding and was also unique to the SDR2."

"...the SDR2 is the only data collector with built-in computation capabilities. It has programs to computer co-ordinates for traverse or topography, computer reference bearings or azimuths, reduce slope distances, inverse between points, compute radial stakeout points, compute traverse closure, calculate and apply an instrument's measured horizontal and vertical collimation error and compute co-ordinates of occupied station from two or more known points. In short, no contest. The SDR2 is the undisputed champ". Leitz President, George Huber, has said that the aim of his company is "to make the SDR2 the IBM PC of the data collection market."

A data collection system has been described as the "marriage of field instrument, data collector and office computer." The advantage of a system such as the SDR2 is that it reduces field measurement time and office computation time. Field notes are standardised and transposition and computation errors virtually eliminated.

INQUIRY 133

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## GOOD NEWS

DATA Peripherals NZ Ltd has just announced a 20% price reduction for its 922 video display terminal. Originally priced at NZ\$2,480, tax paid, the 922 is now list priced at NZ\$1,995, tax paid, quantity one. This reduction makes the 922 the lowest priced VT220 compatible video display terminal on the New Zealand market. "We were able to lower the price of the 922 terminal because TeleVideo's costs to manufacture this product have been reduced," said a Data Peripherals spokesperson.

The 922 terminal is a code-compatible replacement for Digital Equipment Corp.'s (DEC) VT-220 and VT-100 video terminals. The 922 can be used for any information input and retrieval applications with a DEC computer system. The 922 features an alphanumeric keyboard that combines the VT-220 and VT-100 to enhance key placements. The 922 also has enhanced ANSI characteristics, including block mode and function keys that can be programmed in

either the shifted or unshifted positions. These enhanced ANSI features make the 922 versatile in software design applications. Further, the 922 has a tilt-and-swivel screen that can be adjusted to the operator's working position. Its keyboard is a low-profile keyboard that meets the DIN standard for West Germany. A 10-key calculator-style keypad is included for accounting applications. The 922 is upgradable with a Tektronics 4010 compatible graphics board. An amber screen is offered as a no-cost option.

INQUIRY 134

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## A.V.M. EXPANSION

A.V.M. have opened a branch office in Wellington, fully staffed with professional sales and support personnel, and with a new show room.

Also, a sales arrangement has been made with a new, but very professional outlet in Dunedin, Shands Computer Systems, to sell Tandy products in the south of New Zealand.

A.V.M. have, for the last three years, operated a computer school, fully equipped, and with experienced tutors. The customer support section of the Business Computer Division, maintains a constant range of courses supporting both hardware and software advocated by the sales section. The complete school of 10 networked computers is to be moved temporarily to Wellington to fill a need there.

INQUIRY 135

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## AN INTERPRETIVE PASCAL LANGUAGE

*Instant Pascal*, which was announced in July for Apple IIe and IIC computer users, provides an interactive programming environment ideal for students who want to learn Pascal computer programming. The language gives users immediate feedback that speeds the learning process and reduces program development time.

With *Instant Pascal*, programs are ready to execute as soon as they are entered or edited, and results of program modifications are seen immediately. Users can see values of variables and expressions as they change, and can enter and execute Pascal statements while program execution is temporarily suspended. This interactive programming environment enhances the learning process and makes it easier to isolate and solve program errors. *Instant Pascal* automatically checks each Pascal statement for proper syntax as it is entered, and flags any unrecognisable text. Program text is automatically indented to graphically represent the program's logic structure, and Pascal keywords are displayed in bold face lettering.

*Instant Pascal* employs a Macintosh-like user interface that includes up to five overlapping and adjustable windows, pull-down menus and cut-and-paste editing for fast program construction. It fully supports both the keyboard and the Applemouse II, so users can edit and control their programs with either input

device. In addition, *Instant Pascal* supports the Apple II's color display capability, so users can write programs that produce output in up to 16 colors with double high-resolution graphics.

*Instant Pascal* contains virtually all of the functions and standards of American National Standard Pascal and follows the IEEE standard for numeric calculations. It runs on any Apple IIe or Apple IIC personal computer with 128 kilobytes of internal memory, at least one disk drive and a monochrome or color video display. *Instant Pascal* will be available after September 1 from all authorised Apple dealers worldwide.

INQUIRY 132

## ADVANCED SUPER

Skellerup Microsystems Limited, the Christchurch based Systems House, has announced an advanced version of its synchronous UTS Protocol Emulation Routine (SUPER) for IBM and compatible personal computers.

SUPER/PC enables a microprocessor to communicate with a Sperry 110 mainframe at speeds of up to 9600 baud. The new version of the software provides support for 20 independent programmable function keys, extensive on-line screens reducing the need for the user to refer to the printed manuals while operating the software, improved file transfer capabilities, foreign language support, full printer function support, and the ability to view two independent logical screens on one

physical screen. The new version also allows the user to exit the emulation software, manipulate data in the PC/MS-DOS mode, and return to emulation mode without losing the host connection.

According to Allan Williamson, Skellerup's Auckland Area Branch Manager, Skellerup has also acquired a software diagnostic tool to help the user in terminal and line error analysis.

INQUIRY 138

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## MICRO/MAINFRAME INTEGRATION

Skellerup Microsystems Limited, the Christchurch based Systems House, have announced a number of new products in the area of micro/mainframe integration. The systems include facility for Burroughs Mainframe Computers to allow files to be extracted and interchanged with spreadsheet and database software running on most popular micro-computers.

Terminal emulation has now been around for some time, but the new products in this area support what is known as virtual disk technology, that is, the facility whereby programs running on micro-computers can use the power of the micro-computer's operating system to treat mainframe data storage areas as additional micro disk drives. Separate virtual disk areas in the mainframe can be set aside for public and private (secure use). Data stored in a "public" disk can be shared freely by many micro-users, while data stored in "private" disks

can be restricted, as required. Ann Goldsmith, a Market Support Representative for Skellerup Microsystems, referred to these mainframe disk areas as surrogate "hard disk" areas which can eliminate the need to invest in costly hard disk units.

Skellerup are currently working on a set of software which will permit IBM, Burroughs B21, B25 or Wang micros to act as terminals to Burroughs or Sperry Mainframe Computers.

INQUIRY 139

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## W.P. PACKAGE

Skellerup Microsystems Ltd are pleased to announce the New Zealand distributorship and the release of version 3.30 of the MultiMate Word Processing package. MultiMate will be available through an extensive dealer network who will have bulk buying privileges. This version includes an English dictionary and the printing option of proportional spacing. MultiMate's format can now be converted to send MultiMate files via modems, transferring files to and from the IBM Displaywriter and other computers, and from popular spreadsheet and database applications. Screen colours may now be customized, the merge utility has been improved, there is keyboard macro utility, automatic repagination of headers and footers, multiple document directories and path support under DOS 2.0 and an option to create automatic backups.

INQUIRY 140

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## 2500 PACKAGES

Barson Computers has announced three enhanced versions of the Apricot Xi. The Xi10S includes 10 Megabyte 3.5" Winchester and 720K double-sided floppy disk drives and new electronics offering 512K of on-board RAM as standard. The more powerful models, the Xi20 and Xi20S, include 20 Megabyte 3.5" Winchester and 720K double-sided floppy disk drives and the same electronics as the Xi10S. The Xi20 includes 512K of on-board RAM, whereas the most powerful model, the Xi20S, includes 1 Megabyte. All models include two spare expansion slots, enabling the Xis to be connected to a local area network, house an on-board modem, etc.

Besides these enhancements, the new Xi models offer the same advanced features as the original Apricot Xi, including a 16-bit Intel 8086 processor and MS-DOS, thereby maintaining compatibility across the whole of the Apricot range.

"The Apricot Xi has become one of the UK's best-selling business micros and has been well received in New Zealand," said Barson managing director, Doug Pauling.

"The new Xi machines, with their enhanced memory, back-up storage and increased price-performance, are particularly well suited to the requirements of integrated packages, such as Lotus, Symphony and Open Access."

All the new Xi models can be linked into the

Apricot Point 7 multi-user or Apricot Point 32 network systems. They can also run the comprehensive selection of software — which is currently in excess of 2500 packages — available on the Apricot range.

INQUIRY 136

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## BUSINESS SOFTWARE

Jazz, the five function integrated business software package designed by the Lotus Development Corporation to run exclusively on the Apple Macintosh 512K was launched in New Zealand in June this year.

Jazz takes full advantage of the Macintosh interface, which was designed to make working with a computer intuitive and comfortable. Through such features as a mouse pointing device, icons (graphic representations of items, such as file folders and documents), pull-down menus, cut-and-paste capabilities and windows, people can quickly become productive computer users.

"For Apple, Jazz is an important link in the plan to make the Macintosh a truly powerful business tool. The firm's long-term strategy is to provide users with an environment — The Macintosh Office — in which they can work together in the most productive ways possible. Jazz helps firmly establish Macintosh in the corporate market," said Mal Thompson, marketing manager of CED, the sole distributors for Apple products in New Zealand.

INQUIRY 137

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## THE FIRST MSX COMPUTER IN NEW ZEALAND

Early in May, Spectravideo released the first computer on to the New Zealand market which complies with the MSX standard.

MSX is a computer standard which enables the total compatibility of software and peripherals between a wide range of computers. This means that there is already a huge base of software, because developers are attracted by the ability to write programs in one format which can be used by a large number of computers. Similarly, literature and peripherals are applicable to all MSX computers and this has encouraged rapid development.

MSX was developed by Microsoft Corporation in conjunction with Spectravideo (in fact the Spectravideo SV318 was the prototype machine for MSX development) and has now been adopted by other companies. Most of the major Japanese consumer electronics companies have developed MSX computers. However, all of these will not be available in New Zealand. Some of those involved are: Pioneer, Toshiba, Hitachi, Mitsubishi, Sanyo, Canon, Yamaha, Casio, Panasonic, Sony, JVC.

These companies are now producing products which interface directly with MSX computers to provide for the automated home, where appliances such as videos, laser disks, music synthesizers, heaters, air conditioners, security systems, etc., are controlled

by the home computer.

Spectravideo SVI-728, the first MSX computer, has an excellent range of software, peripherals and literature available now. There are already 70 software titles available and peripherals include disk drives, printers, memory expansion, RS232 interface, 80 column capability.

The Spectravideo SV-328 will continue to be sold and supported and will be attractive to the advanced computer user who is likely to require extensive expansion capabilities or true business applications.

INQUIRY 171

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## SUPERCALC<sup>3</sup> VERSION 2 RELEASE

Version 2 of SuperCalc<sup>3</sup> from Sorcim/IUS has just been released. It is the first leading spreadsheet to fully support the 8087 maths coprocessor, thus making it up to 10 times faster than before. Maximum spreadsheet size has been increased to 9999 rows by 127 columns with the data base increased to 9998 records. Cell values still only occupy memory if they occupy significant data.

New features include the ability to iteratively recalculate cell values if they cannot be calculated in one pass. Also provided is the ability to move across pages of a spreadsheet, and the ability to print results sideways.

SuperCalc<sup>3</sup> runs on the IBM PC, PC XT, close compatibles and the NEC APC III. SuperCalc<sup>3</sup> is distributed in New Zealand by Computer Store.

INQUIRY 172

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## SAMNA WP SOFTWARE

Samna Word III and Samna Plus word processing packages are now released in New Zealand.

Word III is an advanced word processing package which is designed for executive office use. It requires no special training course and includes many advanced features, such as mathematical functions, glossaries, automatic section numbering, column movement, automatic contents listing, extensive scrolling features and paginated headers and footers.

Samna Plus is an integrated office automation software package that is

based on word processing features, rather than on a spreadsheet or database. Samna Plus integrates its powerful word processing program with a spreadsheet and word based manager. The word based manager is an information retrieval function for text files which lets users retrieve quickly any items from text.

The word based manager can either cite the location of the occurrence of the word or phrase, reporting the file name or page and line number of each occurrence, or can display the first occurrence, while searching in the background for the next. Samna Plus is designed for users who need to go beyond the capabilities of a word pro-

cessing package, but do not need the full capabilities usually associated with integrated applications packages.

Samna III recently came first in a number of separate evaluations of major word processing package features. Samna III and Samna Plus work on the IBM PC, XT AT and close compatibles, as well as the T1 Professional and the DEC Rainbow. Retail prices are NZ\$1,350 for the Samna III, and NZ\$1,650 for the Samna Plus. For further information contact the New Zealand distributor, Computer Store.

INQUIRY 173

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## GRAPHICS PACKAGE

Digital Research's package, Graphics Environment Manager (GEM), is now available in New Zealand for the Apricot range of microcomputers.

The GEM package provides a 'Macintosh-like' front end to conventional MS-DOS systems. The package utilises pull down menus, and icon graphics to provide a "user-friendly" environment, in addition to the normal MS-DOS system function. An on-screen clock and calculator are provided, as well as a full disk environment manager. MS-DOS subdirectories are supported as a set of folders able to be opened at any time.

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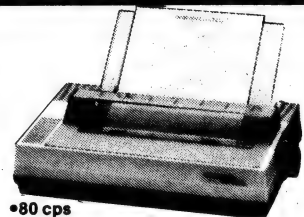
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Additional programs supplied with the system are an advanced ICON editor, GEMDRAW and GEM OUTPUT. GEMDRAW allows the user to create sophisticated graphics and text images in any format which may then be output to printer, camera, screen or color plotter via GEM OUTPUT. The GEM system requires a minimum of 384K of memory and a mouse. Two types of mouse are available for the Apricot range of computers: a conventional cord mouse able to be used with all the Apricot microcomputers, and a cordless infra-red mouse for use with all portable and F1. GEM uses the Apricot's built-in graphics capabilities to provide a high resolution display. The system is particularly effective when used with the Apricot F1 colour display or with the optional color graphics card on the PC/Xi Apricots.

INQUIRY 174

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## VIDEO DISPLAY TERMINALS

Computronic Systems Ltd., a North Shore based company, has been appointed New Zealand distributor for all products from Ampex Corporation's Computer Products Division. As a result of their appointment, Computronic Systems is releasing a range of video display terminals from Ampex.

Using expertise developed from its advanced video technology, an impressive line of full featured editing terminals has been developed. With the introduction of the Ampex 210 and 230, the company has made a strong commitment to becoming a major supplier of high quality terminals, with a wide range of capabilities.

Both terminals offer a tilt and swivel 14 inch non-glare screen in green or amber phosphor, with a soft setup mode. A further range of DEC compatible terminals is soon to be released.

Ampex Corporation has been a major innovator and participant in the computer disk drive business for over 40 years. The company is a wholly owned subsidiary of the Signal Companies Inc., a worldwide high technology and engineering company, with annual revenue of over US\$6 billion. Computronic Systems are actively supporting selected dealers throughout New Zealand.

INQUIRY 184

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## TOP PERFORMER

Lance Hardie is the new Sales Manager at Auckland based Rakon Computers, taking over from Jolyon Ralston, the former General Manager, who has left to start his own business. Hardie spent six years with IBM in Auckland and Sydney, during which time he twice achieved the coveted "IBM Top Performers' Award" in recognition of sales success.

More recently Hardie was the Sales Manager of

IBM Auckland dealer, International Office Equipment. Lance Hardie joins the Rakon team and brings a strong and developed commitment to customers and servicing. While at International Office Equipment he was involved in the marketing, and assisted with the setting up, of the Computer Division. It was later taken over by PowerCorp., an Andas subsidiary.

Lance Hardie sees Rakon Computers as one company in the computer field that recognises its people and Rakon customers as its major asset. He is also quick to point out that Rakon's unique product line-up places the company in a good position for improved sales and future growth. Rakon Computers is a subsidiary of radio equipment manufacturer Rakon Industries and the Australasian distributors and sole agents for Wyse Computers and Wyse Terminals.

INQUIRY 183

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# AUTHORS!

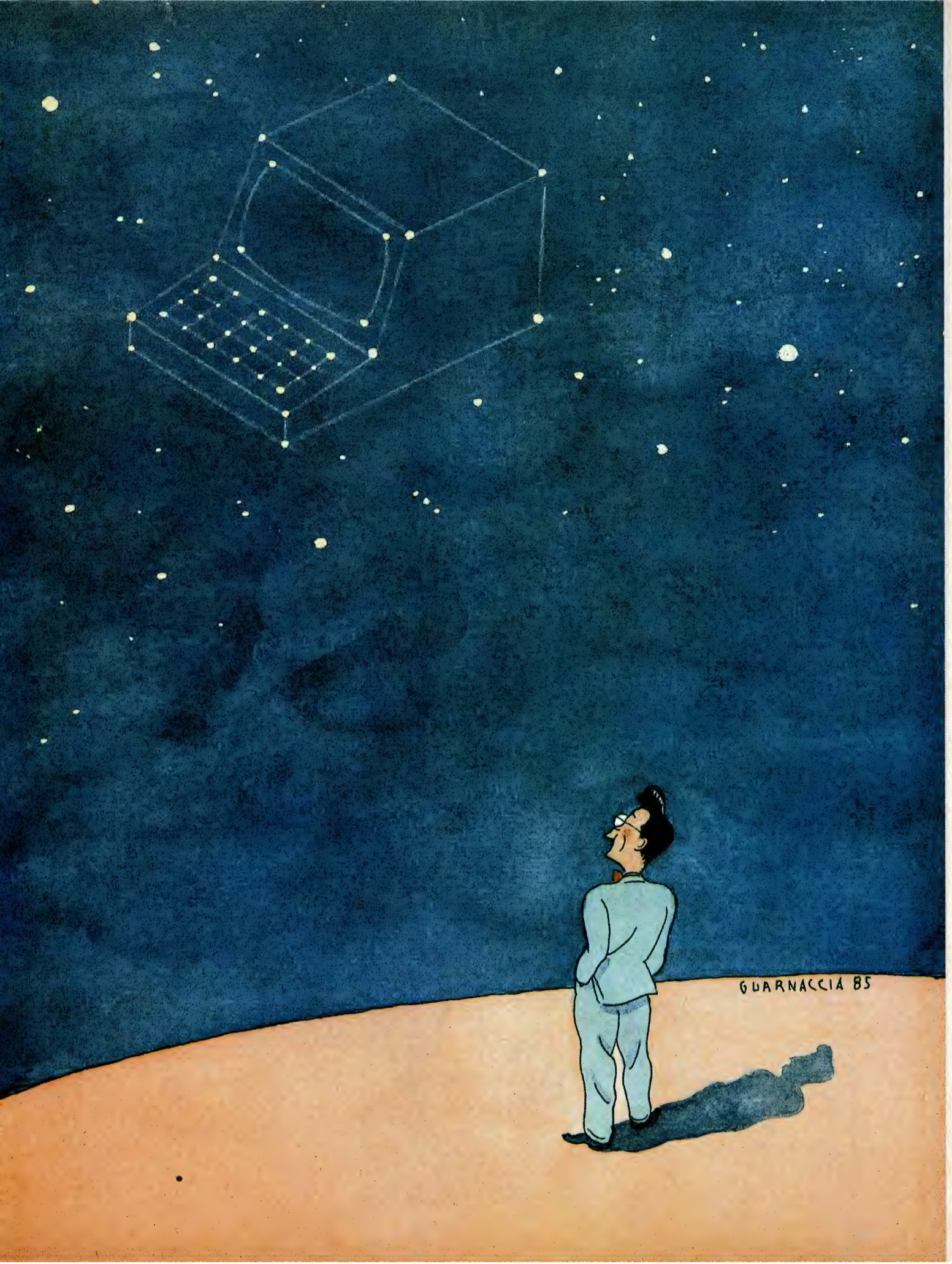
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GUARNACCIA 85







## MICROCOMPUTERS IN NASA'S SIR-B

BY RICHARD WILTON

### *A network of personal computers in the space program*

SINCE 1978, SCIENTISTS at the Jet Propulsion Laboratory (JPL) have been producing remarkable images of the earth's surface using orbiting radar systems (photos 1-3). The images generated by orbiting synthetic-aperture radars are of high resolu-

**Photo 1:** This image of Hawaii was acquired on October 11, 1984, by the Shuttle Imaging Radar-B (SIR-B) during space shuttle mission 41-G. Artificial colors were used to enhance differences in surface characteristics in this computer-processed image. Red areas represent areas of smooth ash cover, dark green is smooth pahoehoe lava, light green is rough aa (cg) lava, and blue represents vegetation cover. The resolution of this image is about 30 meters (100 feet). The area covered is about 26 kilometers wide and 110 kilometers long (about 16 by 70 miles). The image was acquired by SIR-B at a rate of about 7.5 kilometers per second (4.6 miles per second) at an angle of 27.5 degrees. The radar was part of a package of experiments flown on the shuttle for NASA's Office of Space Science and Applications (OSSA). SIR-B was developed by JPL for NASA. Photo courtesy of JPL.

tion and are unaffected by cloud cover. They are of particular interest to geologists, oceanographers, and other students of the earth's surface.

The shuttle imaging radar experiment, called SIR-B, was the third synthetic-aperture radar developed at JPL to be placed in earth orbit. It flew aboard the space shuttle *Challenger* from October 4 to 12, 1984. The SIR-B team at JPL is still analyzing many of the results of the experiment.

Of course, a great deal of engineering and computing effort went into the design of the radar hardware and into generating visual images from the raw radar data. However, this article focuses on two other essential aspects of the SIR-B experiment: planning where and when the radar would be used and monitoring the status of the radar during the mission itself.

#### **HARDWARE**

The SIR-B mission-planning team at JPL put a great deal of thought and discussion into choosing the right computers for the complex task of planning the mission. The team made the decision to use several microcomputers, rather than a single mainframe

or mini, as far back as 1982. The team felt that microcomputers provided the most cost-effective and flexible computational base for fulfilling the SIR-B mission-design requirements.

The overriding considerations were for microcomputers that met the following criteria:

- availability of hardware and software support
- flexibility in hardware options (including memory expansion, communications interfacing, and networking)
- floating-point arithmetic capability

Considering the diversity of software and the large quantity of numeric data to be processed, it was clear that no existing 8-bit processor would have been sufficient. Although a 68000-based microcomputer might have been faster or able to address more RAM, the availability of the Intel 8087 arithmetic coprocessor—and of programming languages that took advantage of its speed and flexibility—

(continued)

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was a big advantage of an 8086- or 8088-based system. The ease with which additional memory, communications hardware, and a local network could be installed on IBM PCs finally led to their use during the SIR-B experiment.

All of the IBM PCs and Compaqs that were used for SIR-B mission planning were equipped with Intel 8087 floating-point coprocessors, video graphics displays, dot-matrix printers, and lots of RAM—512K bytes was considered a minimum workable amount of memory.

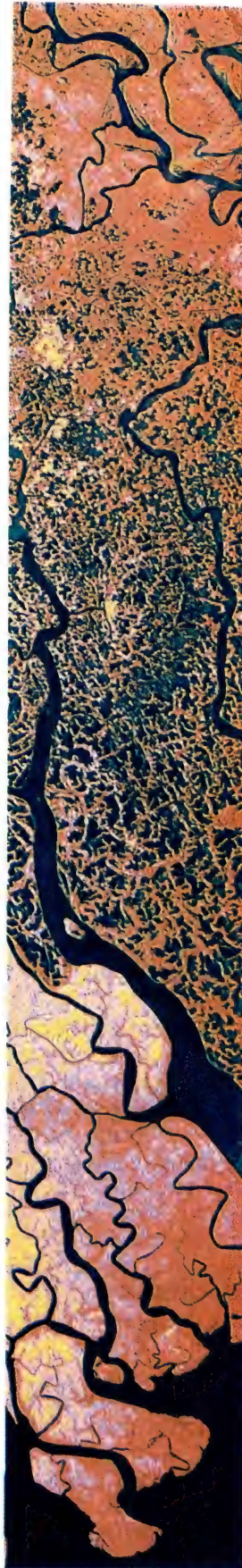
#### SOFTWARE

A lot of new software was required from the outset of the planning phase of the SIR-B mission. Mission-planning software included a great deal of arithmetic computation as well as a fair amount of hardware-dependent programming for graphics and networking. Real-time communications and data-management software was critically hardware-dependent. It integrated machine-level code, such as port-addressed I/O and interrupt handlers, with fairly sophisticated file-management routines.

Both the SIR-B mission-planning software and the real-time communications software were written primarily in FORTH. The off-the-shelf FORTH implementation (PC/FORTH by Laboratory Microsystems) included fast display graphics for the IBM PC, a standard PC-DOS file interface, and high-level support for the 8087 coprocessor. Again, speed, adaptability, and readily available support were major considerations in choosing the programming language.

#### PLANNING THE SIR-B EXPERIMENT

By mid-1983, most of the planning software had been written, including an orbit propagator and world-map display graphics. The calculated orbital path of the space shuttle and the part of the earth at which the imaging radar might be aimed could be rapidly drawn on either a plotter or a video display (photo 4).



In order to be directed at a specific location on the earth, the radar beam could include the calculations for pitch, and yaw) and the calculations for the radar amplitude (roll, aimed at the earth (the angle at which the radar antenna was tilted, etc.)

SIR-B mission planners could display, print, or plot arbitrary portions of the orbital track of the spacecraft. Many complex orbit and attitude calculations were translated interactively into accurate graphical representations on the video display and on printers and plotters. Prior to the SIR-B experiment, these problems in orbital mechanics and spherical geometry had been accurately solved only on mainframe computers.

Plans for the SIR-B experiment were encapsulated in a detailed database of control commands. During the ac-

**Photo 2:** The Ganges floodplain in Bangladesh. SIR-B observations in this area are being used to study the ability of imaging radar to detect standing water in a tropical environment to aid in locating and eradicating habitats of malaria-carrying mosquitoes. Artificial colors in this computer-processed image enhance differences in vegetation and terrain. Pink and yellow represent forested areas, seen most vividly in the coastal forest preserve of Sundarban on the Indian Ocean at the bottom. The textured green and pink area in the center shows cultivated fields connected by extensive irrigation and drainage channels. The more uniform rose-hued area at the top is an area of the Ganges floodplain subject to flooding and major rework during the monsoon season. The city of Jhalakati on the Bishkhali River is the yellow spot in the center, and Barisal is at the upper left center. The area covered in this image is approximately 23 kilometers wide and 155 kilometers long (about 15 by 95 miles). The image has a resolution of 20 meters (65 feet) and was acquired by SIR-B at a rate of about 7.5 kilometers per second (4.6 miles per second) at an angle of 45.6 degrees. Photo courtesy of JPL.



tual mission, sequences of these commands were transmitted from the ground to the SIR-B radar apparatus located in the shuttle's payload bay (photo 5). Each command sequence initiated a specific function, such as aiming the radar antenna, adjusting its power, or turning the radar transmitter on and off.

### COMMUNICATIONS SOFTWARE

Monitoring the status of the SIR-B radar equipment during the mission produced a large amount of telemetry data that had to be processed in real time. Data from two separate telemetry streams (serial-bit streams) was archived. Information concerning the status of the radar equipment (voltages, temperatures, and so on) as well as the position, velocity, and attitude of the spacecraft itself was recorded. Changes in the status of the radar were "logged" in print and on disk for reference during the mission and afterward.

Programming for the telemetry communications interface began in June 1984. The use of FORTH greatly accelerated the development of reliable hardware interfaces. Assembly-language code was easy to incorporate into high-level FORTH programs. Because of the interpretive nature of the FORTH language, the communications software was easily tested and debugged on the hardware.

### DURING THE MISSION

For the duration of the actual mission, four IBM PCs and two Compaqs were combined on an Ethernet local-area network (figure 1). The equipment was assembled in a user-support room at the Mission Control Center in Houston.

The data pertinent to the SIR-B experiment was extracted from the shuttle's telemetry streams by mainframe computers at the Mission Control Center. The radar telemetry data was formatted in blocks. Each block of data contained a date and time code, the attitude and orbital position of the spacecraft, and a sequence of engi-

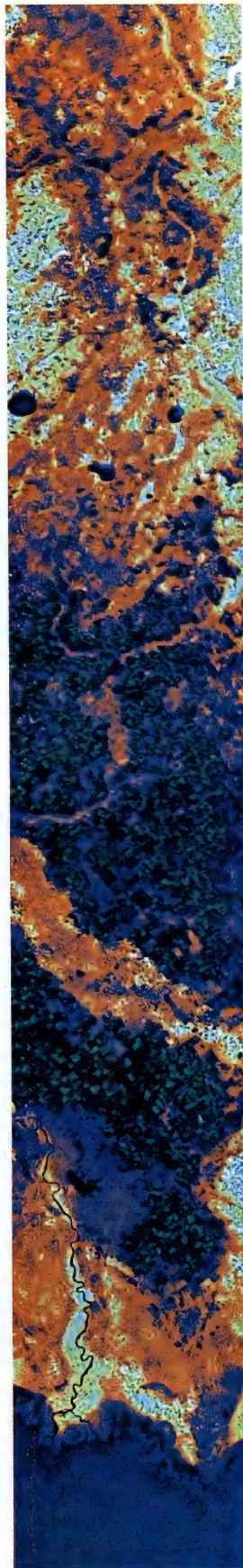
neering telemetry values.

A 68000-based computer, designed and built by SIR-B engineers, converted the raw telemetry data into several formats for further processing. This custom-built machine was programmed in C and cross-compiled to ROM from a VAX. The output from this machine included a 4800-bps (bits per second) asynchronous data stream.

A separate telemetry stream was processed by another mainframe computer at Mission Control. This data was provided as a 4560-bps binary synchronous bit stream.

These two serial telemetry streams, one asynchronous and one binary synchronous, were received on a single Compaq. The data was reformatted on the Compaq and transferred across the network to the network server, an IBM PC XT with a 10-megabyte hard disk. All of the machines on the network, including a 60-megabyte cassette tape drive, had access to the telemetry data as soon as it was saved on the server. Three color graphics displays, two dot-

(continued)



**Photo 3:** This image of northeastern Florida will be used to assess coniferous timber stands and management practices in conjunction with extensive ground measurements at experimental forests and test sites in the area. Artificial colors in this computer-processed image enhance differences in vegetation and terrain. Yellowish-green areas are generally stands of cypress drenched in early morning dew (the image was taken at 3:59 a.m. local time). Three prominent bodies of water (from left to right) are Ocean Pond, Palestine Lake, and Swift Creek Pond. At the bottom is the Gulf of Mexico. Dark green and purple areas are agricultural fields, and bright orange regions denote drainage channels. The image was acquired at an angle of 28.4 degrees at a rate of about 7.5 kilometers per second (4.6 miles per second). The area covered is approximately 29 kilometers wide and 174 kilometers long (about 18 by 106 miles). The resolution of the image is 28 meters (90 feet). Photo courtesy of JPL.



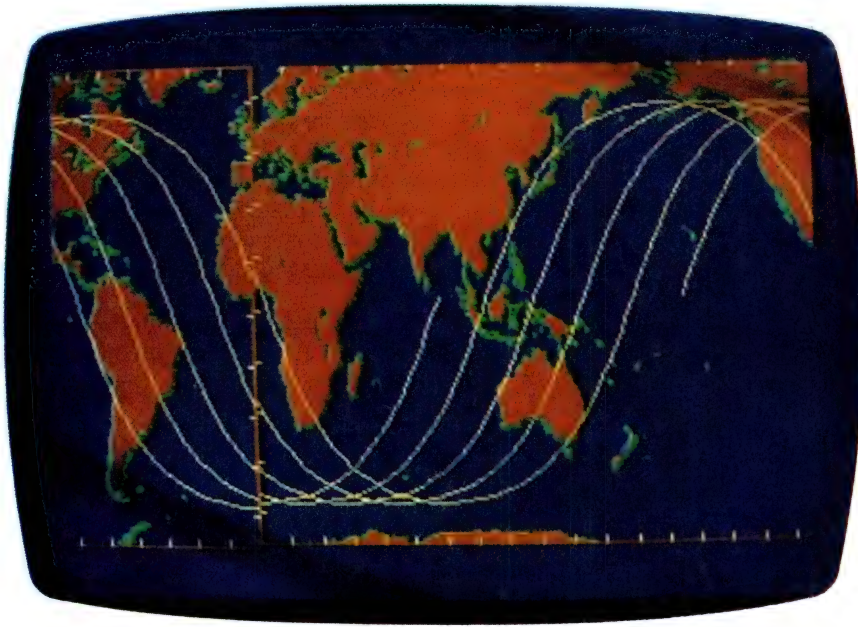


Photo 4: The path of five orbits of the space shuttle is superimposed on a map of the world. Photo by Su Kim.



Photo 5: The SIR-B radar antenna in the payload bay of the spacecraft during the mission. The antenna, at the left, was built in three rectangular segments that were folded together when not in use. This was the case when this photo was taken. You can see most of the antenna's triangular support base, one of the hinges on which the segments of the antenna unfold, and, at the far left, a clasp that locked the antenna closed. The entire apparatus is covered with a white thermal fabric. Photo courtesy of NASA.

*All the commercially available hardware was used "as is"; no special hardware modifications were needed for the system.*

matrix printers, and a line printer were used as output devices.

All of this commercially available hardware was used "as is"; that is, no special hardware modifications were needed to configure the system. Throughout the mission, the networked system performed reliably 24 hours a day.

When a KU-band communications antenna failure aboard the spacecraft compromised one of the essential telemetry links, a great deal of contingency planning was required. Because the SIR-B mission-planning software was easily accessible on the microcomputer network, the SIR-B planning team was able to work around some of the problems created by the loss of the communications antenna.

Also, because it was possible to "replay" events from the telemetry stream over the network shortly after they occurred, the SIR-B engineers were able to keep a close eye on the performance of the radar and its subsystems.

### CONCLUSIONS

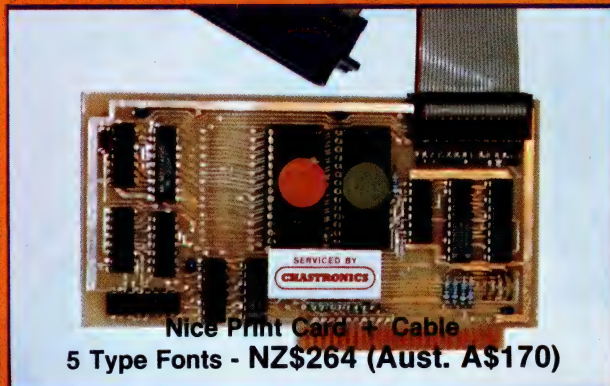
All in all, the networked microcomputer system that was created for SIR-B planning and data archiving performed remarkably well. The advantages of using networked micros in this real-time engineering application were clear: hardware redundancy, distributed processing, and reliability and ease of use of off-the-shelf components.

(continued)



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# EDITORIAL MATERIAL

"JUST COMPUTERS" which is Sydney based has just obtained an exclusive licence in New Zealand and Australia to publish editorial material from the prestigious McGraw-Hill, Inc. computer magazines in the U.S.A., viz., "BYTE" and "POPULAR COMPUTING", and printing in New Zealand will be at the same time as production in the U.S.A. We will be including in "JUST COMPUTERS" much of their high-quality editorial which would be of use and interest in Australasia. In this way, we will ensure that the latest developments in the computer industry (which, in the main, occur in the U.S.A.) would appear for the first time in Australasia in "JUST COMPUTERS". "BYTE" is the small systems journal, 9 year old publishing phenomenon in mini and micro computers, an institution, with recent monthly issues ranging over 500 pages; and "POPULAR COMPUTING", the more recent magazine that enables readers to understand the "why", as well as the "how", of small computers so as to guide their purchasing decisions; the news stand sales success story, with readership studies disclosing more than three quarters of a million readers.

A recent reader survey concluded that "BYTE" was distinguished from other computer magazines by the comprehensiveness and depth of its coverage of personal computing. Such material will appear in "JUST COMPUTERS".

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**JUST  
COMPUTERS**

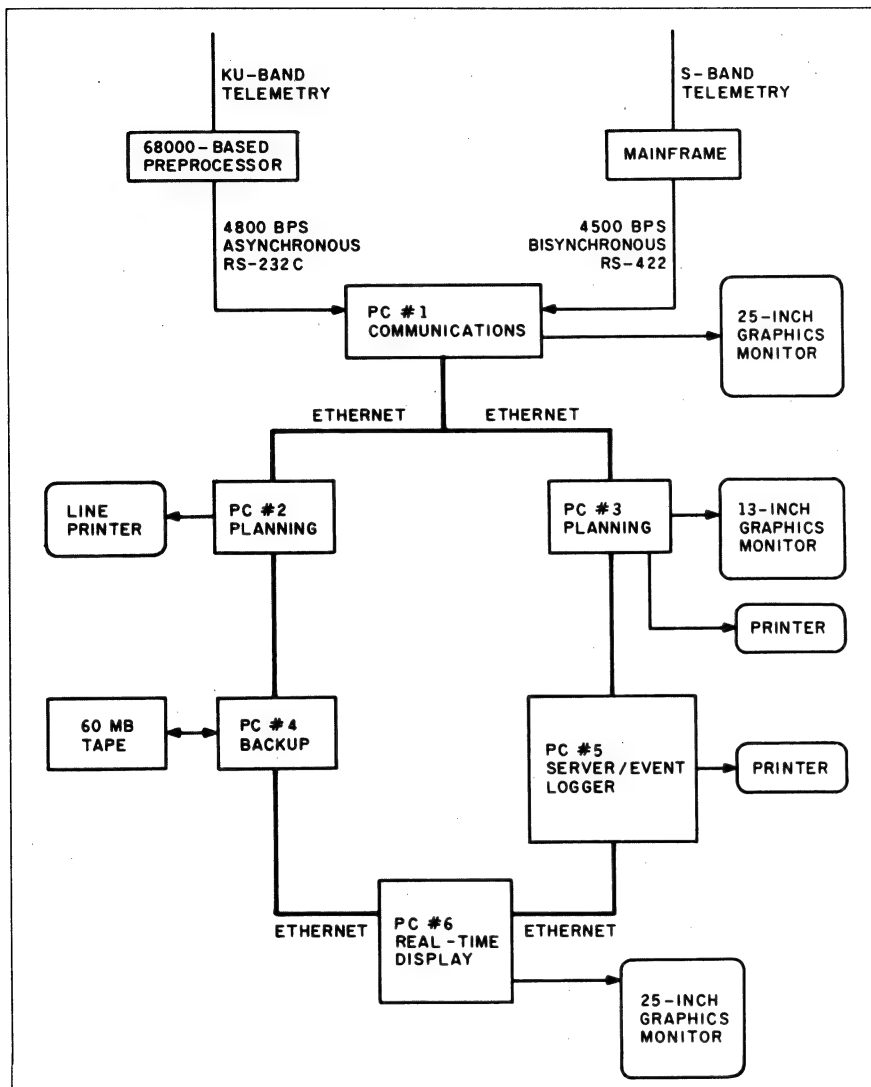


Figure 1: This diagram illustrates the flow of telemetry data during the SIR-B experiment.

The experience gained from SIR-B (as well as the hardware and software) will be used in upcoming imaging radar missions. The SIR-B experiment itself will be repeated on a space shuttle flight in early 1987. A more sophisticated experiment called SIR-C is currently planned for the late 1980s.

The type of network microprocessing system that was created for this particular experiment will find increasingly widespread use in similar environments: hospitals, laboratories, and industrial data-gathering systems, for example. In such settings, distributed microprocessors will be the

most reliable and cost-effective way to gather data and use it flexibly. ■

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# Cognitive Science — The new direction in Australian University Computer Research

By DANIEL HASOFER

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*Whilst most articles in computer magazines deal with new hardware, systems, programs etc., and technological developments in the computer industry, few, if any, look at developments in the universities, the traditional homes of pure research. In this article, DANIEL HASOFER looks at current trends in computer research in Australian universities.*

Whereas university researchers are usually considered to be living in the proverbial "ivory tower", isolated from the realities of the world, researchers in the area of computer science are certainly more in tune than most with developments in the industries which their research supports. Nevertheless, there is a huge amount of technological research going on in the industrial world with which university researchers seemingly have to compete. In many areas, there are times when, in technological terms, universities may lag behind industry. If this is the case, what do university researchers in the area of computing actually research?

When mentioning computing research and universities in the same sentence, most of us immediately think of pale, anaemic computer geniuses huddled in small offices filled with electronics, speaking in unintelligible words. We all know of dilettante computer whizz-kids — often they are our neighbours' or friends' kids who seem to have rejected the real world in favour of that of the computer. Doing a computer science course at university is generally seen as the logical extension to being a computer whizz-kid. Whilst do-

ing computer science courses, such geniuses, it seems, will be able to practise and fine-tune their penchant for computing in the company of similarly inclined individuals. Having completed their degrees, our geniuses duly continue their work, supported by Government research grants, or go out into the business world, where they put their heads together and create brilliant, new, computer applications and later occupy positions in the upper echelons of the computer industry.

## **The Rise of Cognitive Science**

Such a scenario may have had a ring of truth not so long ago and many people still believe that conventional computer science is the sum total of computing research in the university environment. However, in many universities this is no longer the case. Led by universities in the USA, many uni-

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versities are now moving into new areas of research into computers and their uses. Whereas the computer research of yesteryear focussed mainly upon designing newer and better computers, the new generation of research is now focussing more and more upon an interdisciplinary approach to computing. Psychologists, linguists, philosophers, neurologists, and other unlikely researchers have joined forces with computer scientists to study everything from the workings of the brain at the neuron level, to robotics, to artificial intelligence, to theoretical models of the mind, and of thought. A new type of specialist is now in the making — the person with a broad academic background who specialises in research involving not only computers and aspects of computing, but more general issues concerning cognition, mind, consciousness, and thought.

While such research is seemingly far removed from the "traditional" concerns of the computer scientist, the involvement of computer scientists is an indication of changing directions in computing research, and the result of computer scientists themselves increasingly viewing their own discipline (in coherent philo-



sophical terms) as a science of problem solving and its mechanisms.

Although this view has been evolving over the past 20 years, the convergence of new research results in other disciplines has resulted both in a concentration on different approaches to solutions to problems which have not yielded to the analytical hammers of mathematics, and in the emergence of a totally new interdisciplinary cognitive approach to research in the area of computing.

The development of this cognitive approach can be traced back historically to pioneering work by noted logicians and mathematicians, such as Turing and Wiener, theoretical biologists and neurologists, such as McCulloch and Pitts, linguists, such as Chomsky and psychologists, such as Miller, Galanter and Pribram.

The new discipline came about because of relatively simultaneous developments in various fields of study which cast new light upon the traditional problems of the mind. As a result of a cognitive upheaval in the field of psychology and a simultaneous convergence upon psychological issues by the fields of computer science, linguistics, formal logic, anthropology and neurology, a sort of intellectual "critical mass" was reached and the resulting information explosion resulted in the new field of Cognitive Science.

"Cognitive Science" is the term which has gained currency to designate the newly emerged field of scientific enquiry into the mind. The central disciplines of this new approach are computer science, artificial intelligence, psychology, linguistics, the neuroscience, philosophy and logic. Because cognitive science is in essence interdisciplinary, its central issues do not belong to any specific discipline, but rather, fall equally well into all of them and reflect the traditional concerns of all. Problems are fruitfully approached by a variety of methods, some of which are unique to the particular disciplines involved in cognitive science, and others of which have developed within the field of cognitive science.

### Cognitive Science Research

Research projects in the cognitive sciences cover a very broad spectrum. One current direction involves the study of human perception, including methods of real world representation, the nature of visual and mental imagery and our ability to rotate abstract images and representations in our minds. A different area of study concentrates on the structure of game-playing and strategy, looking at useful aspects of problem-solving behaviour and attempting to model these using computers.

A technique common to many endeavours in cognitive science is the utilization of heuristics as well as algorithms. Heuristics may (for our purposes) be defined as rules of thumb, sensible rules and techniques likely, but not guaranteed, to give results. Why use heuristics when we could use algorithms which logically always give correct results (assuming that the algorithms themselves are correct)? Because sometimes the answer cannot be supplied by an algorithm and also because often the application of a heuristic can dramatically improve the performance of a problem solving technique in a given situation. A simple heuristic is the idea of backtracking through a series of steps in a failed technique to find out where it failed. Intuitively, we know that backtracking usually, but not always, allows us to find errors and mistakes.

A more detailed example of heuristics in problem solving is the game of chess. This is a game with well over  $10^{200}$  possible positions. The only algorithm "guaranteed" to reach the optimal move for any position requires the use of "brute force", that is, an exhaustive search and evaluation of every possible move (and its possible moves). Each possible move generates its own branch and tree of possibilities, each of which requires a detailed search. To search this way for even *one* move is impossible for any of today's computers and probably any computer (as we know it) which is ever likely to come into existence, as  $10^{200}$  exceeds by a huge factor the

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**"Cognitive Research" is the term which has gained currency to designate the newly emerged field of scientific enquiry into the mind.**

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number of atoms in the universe, and would therefore require who knows how many lifetimes to provide just the first move of our chess game (is this how God plays chess?).

So how do we approach the problem of finding the optimal move in a chess game, especially in the light of the knowledge that chess grandmasters quickly come up with moves which easily beat the best computers at chess? The use of heuristics allows us to "prune" the search tree, limiting the possibilities which need to be searched, thereby speeding up the process of providing an answer. By noting a few of our heuristics, we can reject a huge number of irrelevant possible moves, leaving us only the relevant moves to search. For example, we generally favour a move which results in the loss of an opponent's piece; we generally sacrifice less important pieces for more important pieces; and we generally like to maintain control of the centre of the board, if possible.

However, none of these heuristics alone, not even the combination of them all, can always provide the optimal next move, and there is no absolute guarantee that in each case the heuristics will provide the correct answer. Their main value is in allowing us to ignore obviously irrelevant moves, and to concentrate our evaluation algorithms on more valuable moves. Such a procedure is known as "satisficing" — providing an adequate and satisfactory result, although not necessarily the absolute best results. Thus, in a situation such as chess, where an algorithm is unable to supply the answer (in our lifetimes at least), the use of heuristics is practical and valuable. It is obvious that a major aspect of the prowess of chess grandmasters is, in fact, heuristic. Be-



## **The Cognitive scientist represents the beginning of the demise of specialization**

cause of the cognitive nature of science, many other types of problems are also approached through heuristics.

### **The Impact of Cognitive Science**

As a result of cognitive science, until recently, computers were servicing an increasing number of disciplines in university research. Now an increasing number of disciplines is coming together to service a new direction of research and computing.

In looking at problems of mind and problems of problem-solving, in particular, the cognitive scientist represents at once a new science speciality, and at the same time the beginning of the demise of specialization (an expert is a person who knows more and more about less and less . . .). As is becoming evident in many fields, specialization has a limit, and this limit is reached when specialized knowledge is gained at the expense of a broader view of research results, which could have a bearing upon current research in a particular field. While expertise in a particular field has until now been a valuable commodity, the research front of computing is moving more and more towards the integration of information gained from research into the separate disciplines.

The creation of the interdisciplinary area of "cognitive science", and the involvement of an increasing number of researchers in the area reflects the importance of approaching the problems of language, thought, intelligence, consciousness, perception, etc., from the joint perspective of these areas.

Cognitive science is currently at a stage where progress is being achieved

far more rapidly via an interdisciplinary approach than via the individual approaches of the separate disciplines. Progress in the fields within cognitive science depends to a very great extent upon the cross-fertilization provided by the interdisciplinary environment. For example, progress on language understanding within artificial intelligence depends, inherently, upon the insights available from linguistics, mathematics, psychology and neurology. Viewing new developments from an interdisciplinary perspective has resulted in productive insights entirely overlooked without this perspective. This pattern of converging and interlocking enquiries is seen to be repeated in all areas of research into thought, consciousness, perception, language, problem-solving, etc. A practical example of this is the development of information theory, which was advanced considerably when aspects of information processing were seen to be mathematically very similar to aspects of entropy and heat transfer in thermodynamics. As a result, the already highly developed mathematical structure of thermodynamics was able to be utilised to improve information theory.

Developments in cognitive science have also resulted in major impact on the distinct disciplines involved in the enterprise. As an example, there has been a shift of emphasis in the philosophy of mind from a reoccupation with the nature of scientific enquiry to the theoretical consideration of the substantive theories of cognitive science and their implications. As a result, perhaps, the prevailing philosophical theory of the mind, "machine-state functionalism", if founded directly upon an analysis of the foundations of computer science and information processing.

### **Artificial Intelligence**

Of great importance as a central discipline within cognitive science is research into artificial intelligence. Artificial intelligence is best exemplified as the branch of cognitive science concerned to devise machines or computer programs which carry

out tasks such as language understanding and speech, visual perception, game playing, theorem solving and problem-solving. Artificial intelligence may appropriately be seen as a pure form of theoretical psychology, allied with computer science and the engineering field of robotics.

Artificial intelligence, once described as an "experimental epistemology" (Ref. 1), has revolutionised philosophical enquiry into the mind in view of the fact that, although the traditional concerns of epistemology with knowledge, perception and language are essentially those of artificial intelligence, artificial intelligence is notable for the explicitness and precision with which it formulates problems and their answers.

The significance of artificial intelligence rests especially in its potential for revolutionary impact on industry and society in general. In Japan, the Japanese Ministry of International Trade and Industry (MITI) undertook in 1980 a major national commitment to the development within 10 years of so-called "Fifth Generation" computers — computers which are "intelligent" in the sense of being able to converse in natural language, which can see, learn, make inferences and decisions, and otherwise behave in ways which until now have been considered the exclusive province of human reason. The Japanese commitment to Fifth-Generation computing, and the resulting co-operation between Government and industry, has sparked a similar response in other high-technology countries, especially the USA. Whilst this sort of technological research has until recently been funded mainly by Government (especially the Department of Defence in the USA), an increasing proportion of university research in artificial intelligence and cognitive science is now also being funded to the tune of many millions of dollars by private sources, such as the Sloane Foundation.

Two other research fields in cognitive science are neurolinguistics and psycholinguistics. Both trace their origins to linguistics — the science of



language, and the work of Chomsky, who pioneered the modern quantitative, mathematical linguistics which resulted in a deeply explanatory, scientific model of language. This had a profound impact on the disciplines of philosophy, as Chomsky's work led to a view of language and mind as a single subject, rather than being unrelated concerns.

The new discipline of neuro-linguistics evolved with neurologists working "bottom-up", taking account of linguistics to guide their detailed neurological research, and, at the same time, linguists working "top-down", paying attention to developments in the neurosciences for guidance regarding the constraints on their abstract theories. Similarly, in psycholinguistics, advances in linguistics stimulated psychologists to search for the mechanisms underlying the mathematically abstract models of linguistics.

#### Universities —

##### The Birthplaces of Cognitive Science

Cognitive science now has a well established academic status as an interdisciplinary research and teaching enterprise. Many universities around the world have established cognitive science centres. Such a centre is currently being proposed for the University of New South Wales, and this would be the first of its kind in Australia.

The establishment of a cognitive science centre is timely for Australia, as Australia needs to remain at the research front if a viable local electronics industry is to be maintained. Failure to establish at least one such centre would result in Australia falling severely behind the research front. As a consequence, the momentum to expand R & D, in what is becoming an increasingly important area of research, would be lost, and any future research positions in the area of cognitive science in both universities and industry will need to be filled with overseas graduates, and Australia's own possibility of remaining at, or even regaining, the research front would be greatly diminished.

A factor in universities which points to the need for a cognitive science centre is evidence that university students themselves are also demanding access to this interdisciplinary study. The large enrolment in a recently introduced course at the University of New South Wales which provides an introduction to cognitive science is worthy of note in that a large percentage of these students were computer science students seeking a new, broader (and previously unavailable) perspective on their generally narrowly technical work. A further large percentage included students completing science degrees majoring in a variety of disciplines. Other students were majoring in psychology, and once again were seeking information unavailable to them in their usual courses.

Also supporting the development of the discipline of cognitive science are the recently formed academic societies, the emergence of several academic journals, and the holding of many conferences in the area of cognitive science.

Because cognitive science is becoming of increasing importance in computer research in general, cognitive science centres would attract quality graduates from both Australia and from further afield. With further developments in cognitive science, both in universities and in industry, there would be an increasing demand for graduates who have the appropriate interdisciplinary training to equip them for both academic and non-academic research work at the research front of cognitive science.

In order to accommodate and provide the training for these new specialists, universities may need to remodel their usual faculty-based structure, at least in part, in order to be able to draw upon the necessary expertise required in providing this type of interdisciplinary teaching and research.

Because of the funding problems of universities in general, the funding of cognitive science will be a problem in spite of its importance. Perhaps the greatest hope is for it to become one of the first (and possibly foremost)

enterprises to be assisted with funding by the private sector under the terms of tax incentives proposed recently by the present government for private sector funding of university research. This would not be surprising, considering that the private sector stands to gain directly in terms of future technology from both the research itself and from the availability of quality graduates through an ongoing cognitive science teaching and research program at an Australian university.

#### Cognitive Science and the Computer Industry

Aside from the purely academic interest in cognitive science is the fact that there is a rapidly increasing concern with computers and artificial intelligence in industry under the more general heading of robotics. Constant media attention and the progress of technology towards Fifth Generation computers mean that the area of cognitive science will become of increasing importance to industry as a source of pure research to guide future technology, and as the source of the researchers and R & D staff of the future.

Cognitive science centres, apart from their primary research role, would also serve as sources of expertise and consultancy for outside organizations, offering seminars, conferences and other productive interactions. The usual academic relations between such centres and other organizations such as the CSIRO, other centres and other research organizations mean that a highly productive network would come into existence as a flow-on from the development of cognitive science centres.

#### The Future and Cognitive Science

Cognitive science is clearly a major direction in the future of the computer industry and electronics industries. With its great impact on traditional computer and allied research, and its rich productivity as a result of its interdisciplinary nature, cognitive science will almost certainly

*Concluded on P.148*



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# Australian Company a Pathfinder in Computer Training Technology

By Dr BRIAN BALDIE

---

The business sector and government departments are stepping up the involvement of their employees in the use of applications software packages. Such business programs provide spreadsheets, databases, word processing and graphics facilities. Because of the wide assortment of computers and software packages being used, the demands placed on the trainer have increased markedly. A person practised in the use of a specific word processing package such as WordStar™ may well have to use Word Perfect™ when moved to another department. While the basic principles of all such programs are similar, the specific procedures must be learned. This is a common situation and has important implications for those in the training sector.

Responsibility for providing the necessary support may rest with the training officer in larger organisations, but it is often left to the individual. A person is either "walked through" a program, or left to discover the relevant material from often inadequate handbooks, which lack instructional acumen. On occasions, the handbook is supported by a

tutorial disk that introduces the user to the important features of programs and provides the trainee with the opportunity to gain some hands-on experience while working on a specific example.

An Australian company, Pathfinder Interactive Systems, has been the first to realise the need for the integration of application training documents, video, and computer-based hands-on experience, into a discreet and comprehensive training system. This program delivers information in textual and video form, provides realistic simulation of procedures and tasks, and offers monitoring of progress through the provision of help messages, answer evaluation and feedback to the learners.

Pathfinder Interactive Systems has co-ordinated the efforts of McGraw-Hill (Australia) and Microcomputer Peripherals and Techniques in merging advanced video and computer technology to provide a system

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*Dr Brian Baldie is Instructional Design Consultant for Pathfinder and a specialist in instructional design at Macquarie University, Sydney.*

capable of achieving the training objectives identified. Dr Robert Graham, Head, School of Economic and Business Studies, New South Wales Institute of Technology, an internationally recognised expert in the use of LOTUS 1-2-3, joined the team as video presenter and content author, as has Dr Brian Baldie of Macquarie University, a specialist in instructional design.

Jointly, they have developed the content which takes advantage of a totally new form of training by coupling the video presentation and the learner's keyboard activity. No longer does the learner need to go to a separate computer, boot-up LOTUS and then try to achieve what had been presented in the video. Now a simulation of LOTUS, built into the training system, guides the learner through the modules. The user moves smoothly from video to computer segments with messages, LOTUS screens and video all appearing in turn on one monitor. This is achieved through an interface card which links IBM PC to a National Panasonic AG6200 or NV8200 video cassette recorder. In addition to the video interface card, a colour/graphics card and at least



128K of memory are required to operate the system.

Exploring LOTUS 1-2-3 consists of three modules addressing areas such as commands, functions, graphing, databases and macros through the integrated computer and video modes. Included are 120 minutes of video presentation by Dr Graham and at least the same duration of keyboard activity. The learner is permitted to move to specific segments, thereby using the system as a resource file, or, alternatively, move along the predetermined learning path. The easy-to-use menu system makes selection simple and places the learner in charge of his/her own development.

An obvious concern to companies contemplating purchase or dedication of computers and video cassette recorders to this system would be whether or not any other material will become available. In this regard Pathfinder Interactive Systems have

## Advanced video and computer technology have been merged to provide a system capable of achieving the training objectives identified.

indicated that *Exploring dBase II/III*, *Occupational Health and Safety*, *Equal Employment Opportunity* and *Offshore Borrowing* are already underway for release during 1985. These are totally Australian products which incorporate the proven audio-visual production skills of Television-Makers Pty Ltd. In addition to these generic programs, any company with its own video footage can approach Pathfinder and have video segments incorporated into an interactive system which takes account of the special training, marketing or communication needs of that specific company. Screens can be revised or updated as required, while video segments can also be deleted or added to the total package.

Exploring LOTUS 1-2-3 can be experienced at the showrooms of Pathfinder Interactive Systems, Suite 301, 99 Alexander Street, Crows Nest, (02) 439-3413. Arrangements can also be made for discussion of customised interactive video programs for specific needs.

To adopt the use of interactive training programs is to provide an efficient, consistent and motivating delivery system that enables trainees to take over partial responsibility for their own learning. It frees trainers from more procedural work and allows them to spend more time addressing individual needs and attitudinal development. The new computer/video technology will not replace the trainers, but it will refocus their energy and allow them to optimise the use of their skills. □□□

*Concluded from P.145*

provide a springboard for completely new technologies in the future.

As such, we may now (at least in part) answer the question posed early in this article — what do university researchers in the area of computers actually research? Part of the answer is to be found in the difference between “pure” and “directed” or “applied” research. Many researchers engage in pure research such as cognitive science, attempting to extend current knowledge in a particular area. Such research does not necessarily seek a specific goal — it can be seen more in terms of exploration based upon intuitive ideas. The published results of such research often provide the theoretical basis for much of today’s technology — the research of which is most often applied and goal-directed.

In the light of this fact, the importance of cognitive science cannot be understated. □□□□□□□□□□

Ref. 1 — The philosophical theory of knowledge.

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*The author is indebted to Dr. P. Slezak (University of New South Wales, Department of History and Philosophy of Science) and to Dr. G. R. Hellestrand (University of New South Wales, School of Engineering and Computer Science) for their help and advice regarding this article.*

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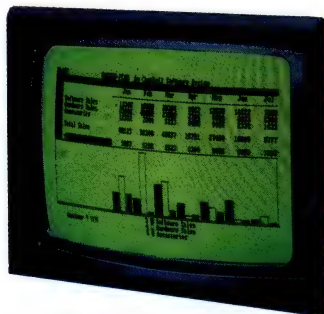
You'll get everything you need, including a monitor (green screen or full colour). We'll even give you a free CPM and Logo disc, so all you do is plug in and you're in business.

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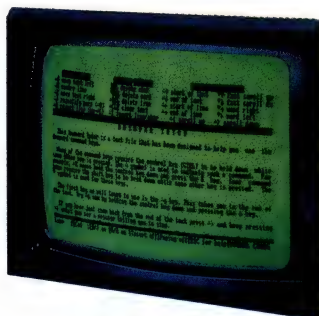
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The one thing you won't need a computer to work out is that the Amstrad CPC 664 represents outstanding value for money.

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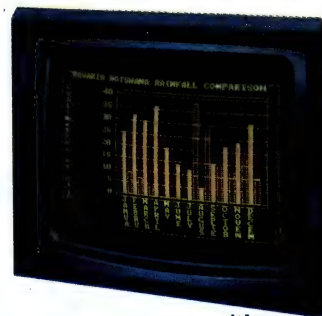


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# TOSHIBA T1500

By CHRIS SZANTO, BRENT CUBIS  
AND CLAUDIA IVANOFF

Before we put Toshiba's IBM PC compatible T1500 to the test, let's examine how an Australian small business owner could use a personal computer.

As an example, imagine a business owner with two suburban shops. Work for a personal computer would be in:

- analysing the prior year's sales, stock movements and other results,
- preparing a budget for the remaining months,
- plotting the current year to date against the budget as each month goes by,
- forecasting the final profit for the year, based on the budget and the results to date for each month.

The exercise would involve a great deal of time for adding and cross-adding, and to produce the required information would also involve multiplying and dividing figures from a number of sources, using calculations, sub-totals, constants (such as the tax rate), individual amounts, and so on. These calculations will need to be re-performed each time there is a change in any of the figures upon which the projections are based.

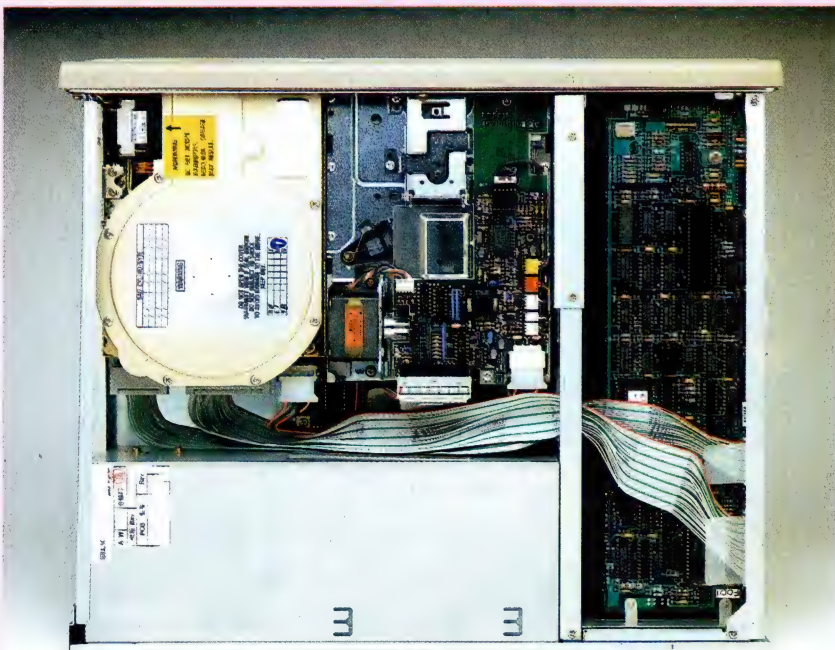
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Chris Szanto and Brent Cubis are from the Business Services Group of Deloitte Haskins and Sells, which specialists in providing micro-computer support in applications development, training, installation support and consultancy. Claudia Ivanoff of Ivanoff Enterprises Pty. Ltd. specialists in information technology consultancy.



The Toshiba T1500 Personal Computer.





Inside the T1500.

## What if?

- Costs rise — To what extent will this affect profitability?
- Production increases — How will this affect business costs?
- Borrowing is needed to finance major expansion — Will the business be able to service the added debt from cash flow?
- Sales of product X increase dramatically — Can demands be met?
- Rent soars — Will the business still be viable?
- A large discount were allowed for a one-off deal — Is it worthwhile?

A PC may well assist this business owner in answering these vital ques-

tions and in making appropriate decisions.

We make no claims. Buying an IBM Compatible PC with suitable software and a printer will probably cost around A\$5,000 to A\$15,000, depending on the supplier and the degree of sophistication required. This PC will not cure all business ills. It will not provide the answers that gut-feel and a feeling for the market place can provide. However, if you need to make decisions based on information, then you may find buying a PC worthwhile. It may certainly gather raw information data more quickly than before. Information may be cheaper and be more accurate. Your PC may become part of your overall business approach.

So you have decided to buy a PC. You have defined your needs and selected your application software. You have probably considered *Financial Modelling Applications* for profit projections, cash flow analyses, budgeting, and similar applications; *Database Applications* for storing and retrieving information for a variety of uses, such as customer records, personnel records, reference information, etc; *Word Processing Applications* for production of letters, reports and financial schedules; finally, *General Accounting Systems* for general ledger, accounts payable, accounts receivable and inventory control, job costing, payroll, fixed assets and industry specific applications.

Now comes the important decision, which PC to buy.

From our work in the consultancy field, we have pinpointed a number of key areas in the selection process. Amongst these are:

1. IBM Compatibility. We do not believe a non IBM manufacturer can claim to produce a 100% IBM compatible machine. So before you buy, check that the software you wish to buy, can run on the machine. Graphics, or copy protected products, could be a problem.
2. Supplier. Check the manufacturer, company stability and



3. commitment to product.
4. Documentation. You will probably need to read the manuals that come with the machine at some time. Make sure they are easy to read and understand, and, more importantly, tell you how to operate the computer.
5. Support. Who offers after sales support? Is it the dealer, the manufacturer, or a third party?
6. Design and Performance. If the machine is designed well and the quality of construction, keyboard and screen display are good, the machine will give more adequate service. Processor speed, memory and disk capacity are also important.
7. Expandability. The IBM PC sets the standard for expandability. The IBM needs to be expanded to run typical business applications. Some machines come with more options than others.
8. Peripherals. Printers, plotters and modems may need to be added. Are they available and how easy are they to install?
9. Choice of Software. The nearer the machine is to 100% IBM compatible, the more software is available.

The review process has now been set up — let's see how the T1500 stacks up. The Toshiba T1500 runs MS.DOS, is IBM-PC compatible and delivers speed, plus reliability, for comparatively low cost, about A\$4230, including dual 360K floppy drives, graphics, printer ports, 256K RAM and monochrome monitor. Being IBM PC compatible, it will operate reasonably well wherever the "workalike group" goes. (Watch out — President 16, Canon, Compaq, Sperry).

Because the Toshiba T1500 meets all business PC requirements with a winning note, it is likely the new 16 bit model will fare well in the marketplace. Several standard benchmarks were run on the machine, plus a hefty suite of MS.DOS business programs (all right, a few games as well), and this T1500 proved to be a

high quality piece of hardware. This system would be suitable for any small business, or as a workstation/PC within a larger network, including IBM PC clones.

## Unpacking and Setting Up the T1500

Most manufacturers assume too much. Not Toshiba. Any novice who is marginally literate can set up the

## How an Australian small business owner could use a personal computer.

system properly by reading the comprehensive documentation. The manual also explains how the system operates and how to take care of the hardware and disks. A diagnostics diskette comes with the system which runs through a menu of tests, from colour on the monitor, to work diskettes, to printer.

## The Processor

The slim line processor design is excellent, resulting in a small, well organised component, representative of Japanese style. The flexible disk drive (360K) has a built-in spring and a door lock, making disk handling easier. The drive was only marginally noisier than other members of the clone community. The review system included 640K memory and a 10Mb hard disk which operated efficiently and quietly. The Toshiba T1500 has a 4.77 MHz 8088 processor, plus optional 8087 co-processor. One standard performance test on any personal computer (or other) processor is the following BASIC program:

```
5 DEFINT A-Z
10 PRINT TIMES$
20 FOR X=1 TO 1000: NEXT X
25 IF Y=0 THEN 30 ELSE
GOTO 10
30 PRINT TIMES$
```

The test is self-timing, and the Toshiba T1500 runs in 10.00 seconds (compared to an identical configuration on the IBM PC: 16 seconds, or the Wang PC: 4.5 seconds). Try running this on your system to see how your processor stacks up. One reason for this is Toshiba's use of gate arrays, one to control the video, while the other controls the processor functions.

## The Screen

Japanese design influence, alas, seems to be absent in both the color and monochrome Toshiba monitors. It is aesthetically unappealing, large and clumsy. Like fish 'n chips, when we order sashimi. Toshiba should follow through on improving this or they may lose sales to other RGB monitor suppliers. The elegance of the slimmer (4cm thinner) processing unit is incongruous with the larger (6cm taller) screen. Other than that, the resolution is typical of this type of machine and certainly comparable to the Olivetti AT&T, President 16 and others around with 640 x 200 pixels in view.

There is also a LCD (liquid crystal display) option (same 640 x 200 pixel resolution), which was not provided for this review.

The T1500 keyboard is similar to the IBM PC keyboard and includes an LCD on both the CAPS LOCK and NUM LOCK keys. While using an IBM PC keyboard (ref. 1), I noticed that the keystrokes don't stack up. Many computers will remember your keystrokes (buffer) and execute them in order of appearance, regardless of typing speed. This system does not stack up keystrokes, but waits for the screen to execute the latest command before accepting any new orders. (Like getting one sushi roll at a time). I wonder why the processor/gateway folk overlooked this detail.

## Peripherals (The Printer)

I know this is not officially in review, but the P1340 dual quality, multiple font plus graphics printer is another

Ref. 1 — As a compatibility test, the IBM keyboard was used instead of Toshiba's own keyboard.



## EDITORIAL MATERIAL

"JUST COMPUTERS" which is Sydney based has just obtained an exclusive licence in New Zealand and Australia to publish editorial material from the prestigious McGraw-Hill, Inc. computer magazines in the U.S.A., viz., "BYTE" and "POPULAR COMPUTING", and printing in New Zealand will be at the same time as production in the U.S.A. We will be including in "JUST COMPUTERS" much of their high-quality editorial which would be of use and interest in Australasia. In this way, we will ensure that the latest developments in the computer industry (which, in the main, occur in the U.S.A.) would appear for the first time in Australasia in "JUST COMPUTERS". "BYTE" is the small systems journal, 9 year old publishing phenomenon in mini and micro computers, an institution, with recent monthly issues ranging over 500 pages; and "POPULAR COMPUTING", the more recent magazine that enables readers to understand the "why", as well as the "how", of small computers so as to guide their purchasing decisions; the news stand sales success story, with readership studies disclosing more than three quarters of a million readers.

A recent reader survey concluded that "BYTE" was distinguished from other computer magazines by the comprehensiveness and depth of its coverage of personal computing. Such material will appear in "JUST COMPUTERS".

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**JUST  
COMPUTERS**

excellent device from Toshiba. Until we all learn to use and accept mail electronically, the printed output will remain an important product of business. The P1340 printer is outstanding from several standpoints. Included in the design features are several items which work together to avoid damage to the printer or wasted time in getting the desired effect. It can produce a fast draft, or emulate daisywheel output, and the various controls and adjustments include a white etched ruler to allow one to line up the paper perfectly, first time. Most printers are sadly lacking this simple, critical feature. It was tested under the T1500 menu of diagnostics, and stops itself at signs of trouble.

### Installing and Running Applications

Standard red disk drive lights flickered while software loaded expediently into the directories established within the hard disk. Most PC's also will "beep" when the user makes an error (or a misjudgement, or types too faaaaaassssttt). This machine sounds like a baby chick, which is really cute. What is NOT cute, is that if one tries to run a "pirated copy of ....." it turns into a rooster, beeping and crowing until you turn it off or put in the original program disk to shut it up. I found this "disciplinary touch" endearing.

The system was tested with the following applications:

Symphony; Easywriter, Basic; Timeline; Flight Simulator; Multimate; Workload.

"Paint" was also supplied on the disk, but alas, not a mouse in sight to check it out. It looked as good on the Toshiba monitor as it does on the IBM. All applications software ran without problems, straight out of an IBM PC into the T1500 and back again.

### The Upshot

Statistics show that most people are still using personal computers for word processing, database, spreadsheet and communications to outside data banks. Scientists are now starting

to be Unix-exclusive and will want Unix and C compilers on a PC. A majority of all Australian businesses do not use computers at all, so there is a lot of room for innovation and IBM compatibles which will increase their acceptance.

The Toshiba T1500 is a sensible, competitive, highly marketable machine. As a guide, the RRP of the T1500 with two disk drives, 256K RAM, monochrome screen and keyboard is A\$4,230 and the T1500 with a single floppy, 10Mb hard disk, 640K RAM, colour screen and keyboard, A\$7,550. Typically, a T1500 configuration should be 15% less than a similarly configured IBM PC. The T1500 was released at Data 85, so has been on the Australian market for a very short time.

### The Toshiba Story

Toshiba is a well respected name in the electronics industry. Toshiba (Australia) Pty Limited is a wholly owned subsidiary of Toshiba Corporation Japan. During the past 10 years Toshiba (Australia) Pty Limited have entered a number of areas including photocopiers, high technology medical diagnostic equipment and now personal computers and printers. As an indication of stability and size, Toshiba Corporation Japan was founded in 1875 and in 1984 had a net sales income of US\$12.5 billion.

Toshiba's Australian operations comprise 250 employees with offices and warehouses in each of the main capital cities. The dealer network numbers 35, with the majority located in New South Wales, Victoria and Queensland. Honeywell provides the third party hardware support. □□□

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**JUST  
COMPUTERS**

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# SMARTKEY - A case of mistaken identity

By STEVE KEEN, B.A., LLB, Dip. Ed.

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*It seemed like another example of American computer ingenuity which was typically not yet available in Australia.*

I first saw advertisements for Smartkey in American computer magazines. According to the hype, Smartkey enabled you to redefine the keys of your computer to send any character or characters you wanted. Promising the ability to turn one keystroke into 3,000, it seemed like another example of American computer ingenuity which was typically not yet available in Australia.

I could see plenty of uses for it. As a Perfect Writer user, I longed for a faster way to enter "@begin(quotation)@end(quotation)" than typing the 33 keys involved. As a DBase II programmer, I could use it to create command files for data entry from a simple file printout of field names. As a writer who last used a pen in the dim past of 1982, it seemed as important for my post-RSI future as an ergonomic chair.

Smartkey was finally advertised in an Australian magazine about a year ago. The suppliers, FBN Software of Canberra, sent me an MS-DOS 5¼" disk, whose contents I transferred to my 3½" Apricot.

Disaster. Every attempt to load the program simply jammed up my keyboard. Rather than having a multitude of keystrokes at my command,

each and every key could only reproduce the first letter I typed after invoking Smartkey.

I rang the suppliers to let them know that, however it might function on other IBM machines, it was worse than useless on the Apricot. I described the problem and suggested that they let "the authors in the States" know about it. Helen Hammond, FBN's manager, said "Well, the author's my husband and he's in the next room. I'll tell him. We'll get back to you as soon as we find out what's going wrong."

Within a week, they had mailed a revised version of Smartkey. The original fault lay not with Smartkey, but with the Apricot's BIOS, where it used one byte for a keyboard interrupt, when it claimed in its documentation to use two bytes.

To this day that experience remains my best proof of the adage that it is best to buy your software from a local store, since they can respond quickly to problems.

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Steve Keen is an economist with the Australian Department of Trade.

## The Company

Smartkey's author, Nick Hammond, actually writes his programs in the spare time left to him after a "more than 40 hours a week" job with the Australian Navy. He has been writing computer code since 1974. The company is a two person operation, managed by Helen, handling its own marketing in Australia, while a USA software publishing house handles the rest of the world.

The first version of Smartkey was produced in 1981 and it was originally written for CP/M version 1.4 — a version of that 8 bit operating system which is so "old" in computer terms that most present day users wouldn't even have heard of it. It was written in Sydney, but, before it was completed, Nick was sent to the States for a course, hence its apparent US origins. Initial marketing was via mail order, after which a software publisher offered to take over distribution.

It has been quite a success in the U.S.A., selling over 20,000 copies and inspiring a number of imitators, including a recent offering from Borland.

Smartkey is a demon which sits beneath the operating system and



# Authors!

*If you haven't yet  
tried to be, you  
might be the  
outstanding  
discovery of the  
new computer  
discipline — where  
successful authors  
have ages that  
barely register on  
the Richter Scale.*

*Or, we hasten to  
add, if you are an  
established writer,  
or widely  
experienced in any  
aspect of the  
interlocking  
sections of the  
computer industry,  
or have superior  
knowledge of a  
specific area of  
computer  
technology or  
commerce, then we  
need your articles  
(short or long) and,  
we hope, the  
exposure we can  
give will be  
beneficial to your  
career. We also pay.*

*With such an  
appeal, we should  
increase the sizes  
of our post office  
boxes in Otahuhu,  
Auckland, and  
Broadway, Sydney.  
It's over to you.*

**JUST**  
COMPUTERS  
WITH NEW ZEALAND PERSONAL COMPUTER

## Smartkey is a demon which sits beneath the operating system and “captures” whatever character you have typed at the keyboard.

“captures” whatever character you have typed at the keyboard. If the character hasn't been redefined, then everything proceeds as normal: the character is entered if it's a character or number, or the command executed if it's a control code. But if the character has been redefined, Smartkey replaces it with the definition you have already supplied.

Smartkey designates a particular key as the “supershift” key, which is rather like the escape key in operation: after you type it, the next key you type has a different meaning. This allows you to leave the actual characters sacrosanct, and still have over 70 “Smartkeys”, counting supershifted lower case keys, upper case

keys and control keys (keys typed while holding the control key down).

The replacement characters can be either extra characters — I can type my address onto a letter by simply pressing the “Supershift” key and the letter “a” — or they can be a whole sequence of commands. This latter application adds a “macro” or programming capability to programs which lack it.

Smartkey can also wait for input within a character string. I use this for Perfect Writer's formatting commands, so, when setting a page heading, Smartkey types the skeleton “@pageheading(left=”, centre=”, right=”)” and waits for input from me between each pair of inverted commas. It can be used, if you wish, to store an entire form letter on one key. Supershift-d could, for example, generate your “debtor's” letter; it would wait for the person's name and address at the top, and fill out the rest after that was supplied. Another frequent use for it is to automate a number of DOS commands, so that supershift-c could invoke file copying, supershift-d a directory, and so on.

Definitions can be saved in a file, or made on the fly during any other program, simply by pressing the Smartkey and then indicating which key you wish to redefine. I frequently redefine the TAB key to perform an otherwise cumbersome operation, for example, searching for all occurrences of a word, converting it to upper case, centering it and making it bold face.

A new version, Smartkey 5, is about to be released for the IBM (in these days of hardware-based industry standard, people no longer author a product for an operating system) which will use windows a la Borland Sidekick for definitions, menus, and so on. It is much like Lotus to use, enables you to see how a definition will look in the test before it is entered, and provides a software lock for the keyboard.

Smartkey's usefulness in word processing and database applications simply can't be overrated. At only A\$77, it's something which every computer user should have.

## FOR COMPUTER SHOPS

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WITH NEW ZEALAND PERSONAL COMPUTER



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## Xerox Products

**X**erox recently announced the 6085 microcomputer, a line of personal microcomputers, and a laser printer.

The Xerox 6085 is offered in models for network, remote, and stand-alone operation. The networked and remote models can share resources linked by Ethernet.

The 6085 is founded upon Xerox's Mesa processor, an 8-MHz device. The Mesa processor has 256 auxiliary registers and executes 48-bit-wide instructions. The 6085 also uses an 80186 chip as an auxiliary processor.

The basic 6085 comes with 1.1 megabytes of memory, a 10-megabyte hard-disk drive, two serial ports, and a 15-inch high-resolution (880- by 697-pixel) monochrome display. You can expand it to include 3.7 megabytes of memory and up to 80 megabytes of hard-disk storage.

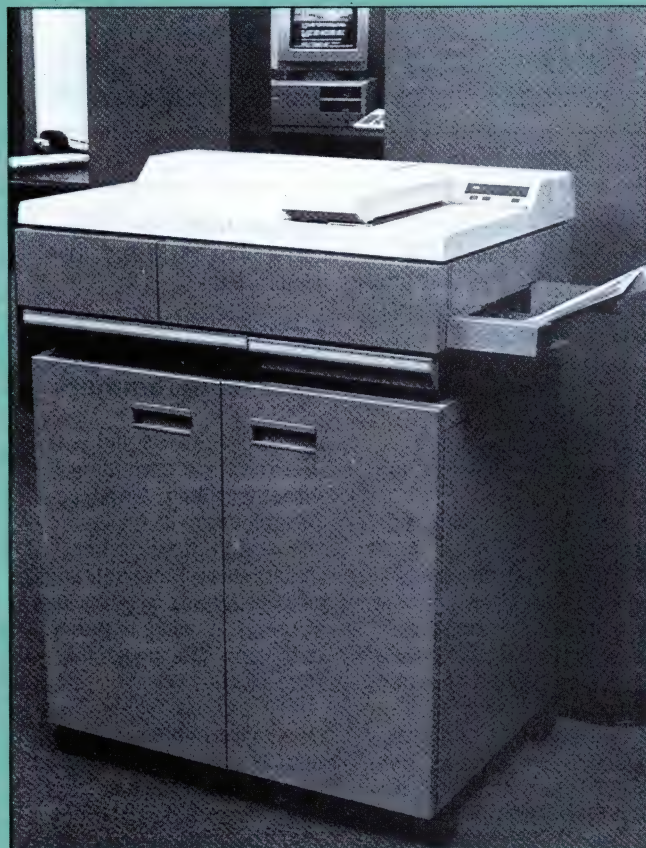
Xerox offers hard-disk drives with 20, 40, or 80 megabytes of storage, and a 360K-byte floppy-disk drive is also available. An optional board gives the 6085 the ability to run software prepared for IBM PC-DOS.

System software includes the ViewPoint windowing package, which uses icons and is controlled with an optical mouse. ViewPoint is \$125. A variety of applications software, including a software-development package, is planned.

The 6085 begins at \$4995.



*The Xerox 6085.*



*The Xerox 4045 Laser CP.*

The Xerox 6060 family of PCs comprises four computers: a pair of IBM PC work-alikes, the Xerox 6064 and 6065, and two dedicated word-processing systems, the Xerox 6067 and

6068. The 6067 and 6068 keyboards have been modified for word processing. Both systems come bundled with Xerox's word-pro-

cessing software and can run MS-DOS applications software.

Each Xerox 6060 comes with ScreenMate, a menu-based shell program for interacting with MS-DOS.

The general-purpose 6064, with two 360K-byte floppy-disk drives and 256K bytes of memory, retails for \$2885. The hard-disk-based 6065 lists for \$4485.

At \$2985, the 6067 includes dual floppy-disk drives and 384K bytes of RAM. The 6068, which is equipped with a 10-megabyte hard disk and 512K bytes of memory, costs \$5150. Both the 6067 and the 6068 use a 640- by 400-pixel monochrome display.

Xerox rates its 4045 Laser CP "lasographic" printer at 10 pages per minute and 5000 pages a month. It comes with 128K bytes of memory, two fonts, and your choice of Centronics or Dataproducts parallel ports or an RS-232C asynchronous connection. Additional cartridge-based fonts are offered.

If you choose to expand the 4045 Laser CP to its full 512K bytes of memory, you can reproduce a 5- by 7-inch image in a 300- by 300-dot-per-inch format. You can reproduce a full-page graphic at 150 by 150 dots per inch. The 4045 Laser CP has a 250-sheet paper cassette, and cassettes for European paper are available. It's compatible with the Diablo 630 daisy-wheel printer.

A copier option lets the 4045 Laser CP function as a standard photocopier. Other

*(continued)*



options include an envelope cassette, an interface that permits four PCs to share its resources, and a network interface for linking the 4045 Laser CP to IBM 3274/3276 networks and Systems 34/36/38 environments. The suggested list price for the 4045 Laser CP is \$4995.

Contact Xerox Corp., Xerox Square 006, Rochester, NY 14644, (716) 423-5078.

INQUIRY 61

## IBM PC XT, PC AT-Compatible Computers

**N**CR's PC8 and PC6 are compatible with IBM PC AT and IBM PC XT computers, respectively.

The PC8 can serve as a stand-alone computer, as a 16-member multiuser system, or as a network server for up to 63 nodes. In its single-user configuration, the PC8 runs under NCR-DOS 3.1. The multiuser operating system is XENIX.

Featuring Intel's 6-MHz 80286 microprocessor, the PC8 is reportedly able to run virtually any software designed for the IBM PC AT without modification. It can also use AT-compatible hardware.

Standard are 256K bytes of RAM, a 1.2-megabyte floppy-disk drive, six expansion slots for devices with 8-/16-bit data paths, two expansion slots for devices with 8-bit data paths, and a battery-backed system clock. The keyboard has LED indicators and 30 program-mable function keys.

Optional are a monochrome monitor with a non-glare 80-character by 25-line display and 640- by 400-pixel resolution and a



The NCR PC8.

14-inch color monitor with 16-color capabilities. GW-BASIC is available, and internal memory is expandable up to 4 megabytes.

The basic PC8 begins at \$3795. A configuration with 512K bytes of RAM, a floppy-disk drive, and a 20-megabyte hard-disk unit is \$5505.

The PC6 is supplied with Intel's dual-speed (i.e., 4.77/8-MHz) 8088-2 microprocessor, 256K bytes of RAM, twin 360K-byte floppy-disk drives, RS-232C and parallel interfaces, and eight expansion slots. It comes with NCR-DOS, which provides compatibility with the IBM PC XT. An on-line help program, GW-BASIC, and a pair of tutorial software packages are also standard.

A number of mass-storage configurations are offered, including 20 megabytes of hard-disk storage and 10 megabytes of streaming-tape backup.

Options include monochrome and color monitors. PC6 pricing begins at \$2583.

Contact NCR Corp., Dayton, OH 45479, (513) 445-2075.

INQUIRY 62

## Visual Environment for C Programmers

**L**iving C—Personal is a visual programming environment for C-language programmers. It facilitates the design, development, maintenance, and debugging of C programs by showing you exactly what happens at each step of a program's execution.

You can use Living C—Personal to animate your source code during execution. You can do this statement by statement within user-specified breakpoints or through the entire program. When a bug is found during compilation, Living C—Personal does not force you

to abandon the environment because its full-screen editor is still available.

With Living C—Personal, your program's output is separated from the debugging information by on-screen windows. You can use the window facility to continuously display a variable's value or to examine and alter the variable.

Living C—Personal provides help facilities and explicit error diagnostics, and it conforms to the Kernighan & Ritchie C standard. It runs under PC-DOS and is priced at \$99. Contact Living Software, London House, 243-253 Lower Mortlake Rd., Richmond, Surrey, England; tel: 44 1 948 5166; Telex: 946 240 cweasy.

INQUIRY 63

## IBM Jetprinter and Proprietary

**I**BM has announced a color ink-jet printer and a replacement for its dot-matrix Graphics Printer.

The ink-jet Color Jetprinter can produce hard copy in seven colors. Its dot resolution is 100 by 96 pixels per inch. The Color Jetprinter sells for \$745.

The dot-matrix printer, called the Proprietary, is compatible with the Graphics Printer but is faster, with an advertised speed of 200 cps in draft mode and 40 cps in near-letter-quality mode. It has a maximum horizontal resolution of 240 pixels per inch. The Graphics Printer, which Epson manufactured, is being discontinued. The Proprietary is made by IBM and sells for \$549.

Contact IBM Corp., Information Systems Group, 900 King St., Rye Brook, NY 10573.

INQUIRY 64

(continued)



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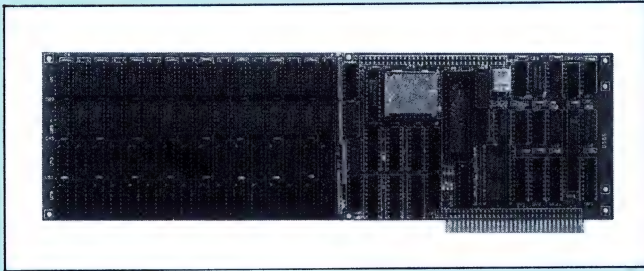
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# Breakthrough

S O F T W A R E





*Pfaster286, an 80286 add-in board for the IBM.*

## 80286 Add-in Board for IBM PC and PC XT

**P**hoenix Computer Products' Pfaster286 is an 8-MHz 80286-based add-in board that gives the IBM PC and PC XT the ability to process data at a faster rate than the IBM PC AT. It does not impair the functionality of the PC's or PC XT's resident 8088 microprocessor; rather Pfaster286 reassigns the 8088's intelligence to I/O management.

Pfaster286 can run MS-DOS 2.0, 2.1, and 3.1 programs, and applications designed for the IBM PC and PC AT will operate with it. Pfaster286 has software switches that let you jump back and forth into the native 8088 mode for those applications requiring that chip's performance characteristics.

The basic Pfaster286 is supplied with 1 megabyte of RAM, expandable to 2 megabytes, and an empty socket for an 80287 floating-point processor. Your operating system and applications software can use approximately 704K bytes of this board's RAM. Some of its miscellaneous features are disk caching, diagnostics, four DMA channels,

eight levels of priority interrupts, and 16K bytes of EPROM expandable to 256K bytes.

Pfaster286 is \$2395, which includes an 8088 service program to call up the board and to load Pfaster286's AT ROM BIOS-emulation software. The 80287 mathematics coprocessor is \$350, and 512K-byte RAM increments are \$400. Contact Phoenix Computer Products Corp., Suite 115, 1420 Providence Highway, Norwood, MA 02062, (800) 344-7200; in Massachusetts, (617) 762-5030.

INQUIRY 65

## High-Speed Modem

**A**n asynchronous 9600-bps modem, the UPTA 96, comes in an internal, piggyback version for the IBM Personal Computer and in a stand-alone configuration with an RS-232C connector for a variety of computers. The suggested retail price for the add-in card is \$795, and the stand-alone UPTA 96 is \$895.

This intelligent half-duplex modem operates over standard dial-up telephone lines or through computer-to-computer links. Its data-rate selectable for 4800-, 7200-, and 9600-bps transmission speeds, with automatic fall-back to 7200 or 4800 bps when noisy lines are encountered during 9600-bps communications. Standard

are automatic adaptive equalization to ensure data integrity, auto-dial, auto-answer, full-duplex emulation, and compatibility with the Hayes command set.

The UPTA 96 comes with proprietary error-detection/correction circuitry firmware known as EDI (Ensured Data Integrity). EDI organizes data into numerically sequenced packets, with each byte subject to a cyclic-redundancy check and packet-check generation during

ing transmission. The protocol also offers selective automatic request for transmission (ARQ).

The UPTA 96 supports asynchronous 3270 and VT-100 emulation software. It's FCC-certified for direct connection to the public-switched telephone network by means of a USOC RJ11 jack. Contact Electronic Vaults Inc., Suite 714, 8350 Greensboro Dr., McLean, VA 22102, (703) 883-0331.

INQUIRY 66



*The Zenith Z-200 is compatible with IBM's PC AT.*

## Zenith's Z-200 Advanced PC

**Z**enith Data Systems' Z-200 Advanced PC, an IBM PC AT-compatible computer, uses Intel's 6-MHz 80286 microprocessor and no-wait-state technology for increased processing speed. The standard model comes with 512K bytes of dynamic RAM, a single 1.2-megabyte floppy-disk drive, six expansion slots that can accommodate AT hardware, and MS-DOS 3.1. It costs \$3999.

RS-232C, Centronics parallel, and video interface ports are provided on this computer. A choice of video cards is offered. The Z-200 Advanced PC also comes with a combination Winchester/floppy-disk controller

board that can handle two floppy- and three hard-disk drives.

The Z-200 Advanced PC's keyboard features enlarged backspace, delete/insert, caps lock, scroll lock, and system request keys. Impression marks on the home-row keys have been included.

The Z-200 Advanced PC's dynamic RAM can be expanded to 16 megabytes in 1.5-megabyte increments. XENIX is available for multiuser, multitasking environments. The Z-200 Advanced PC can be obtained with a 20-megabyte hard disk for \$5599.

Contact Zenith Data Systems Corp., 1000 Milwaukee Ave., Glenview, IL 60025, (800) 842-9000, ext. 1; in Illinois, (312) 391-8949.

INQUIRY 67

(continued)



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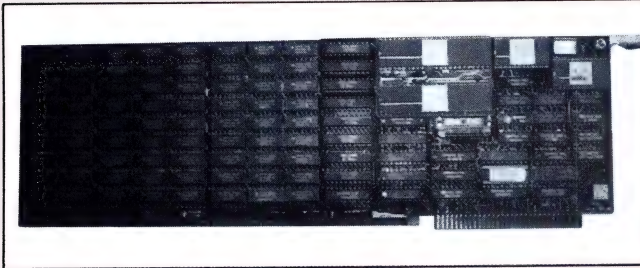
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The Tiger-32 accommodates 2 megabytes of no-wait-state RAM.

## NS32032 Add-in Board for IBM

The Tiger-32 is a 32-bit add-in board for IBM PC, PC XT, and PC AT computers. It has a 6- or 10-MHz National Semiconductor NS32032 or NS-32016 central processor, an NS32082 demand-paged virtual-memory manager, and from 512K bytes to 2 megabytes of no-wait-state RAM. Tiger-32 comes with Microsoft-Logica's XENIX-32 version 3.0, a two-user operating system.

The Tiger-32 can execute large programs, but it does not execute IBM PC code

directly. It can function as expansion memory or as a disk emulator. Among its hardware specifications are two RAM ports, parity error checking, and 150-nano-second access time.

The board has both linear and window modes. In its linear mode, the Tiger-32 acts as an expansion memory. The window mode lets your PC access the Tiger-32's RAM through any one of sixteen 128K-byte windows.

With XENIX-32, this board uses PC-DOS 2.0 or higher as an input/output processor. The Tiger-32 comes with a visual shell interface,

software-development utilities with C and assembly language, and communications, text-processing, installation, interfacing, and test software.

Up to 2 megabytes of RAM and a 32-bit floating-point mathematics unit are optional. Software options include remote user capability, BASIC, COBOL, FORTRAN, and Pascal.

The Tiger-32 with 512K bytes of RAM, a 6-MHz NS32016, and XENIX-32 is \$2495. With the NS32032, it's \$2795. The mathematics unit is \$425 at 10 MHz and \$275 at 6 MHz. Contact DFE Electronic Data Systems, Suite 115, 5820 Stoneridge Mall Rd., Pleasanton, CA 94566, (415) 847-2024.

INQUIRY 68

## Macintosh Spreadsheet

Crunch for the 512K-byte, single-drive Macintosh is an integrated spreadsheet

program with graphics, data-management, and notekeeping capabilities. The suggested retail price is \$295.

Crunch's spreadsheet gives you a 250-column by 9999-row work area, and it can be linked with other worksheets. Depending upon the font used, you can display up to 31 rows on the screen. Wide spreadsheets can be printed out sideways.

Seventy-four mathematics, trigonometric, statistics, logic, financial, table, and date functions are built into Crunch. In addition, it has three special functions and gives you the ability to define up to 1000 functions.

Crunch can perform both natural-order and row-wise calculations. You can hide or password-protect cells containing sensitive data. Other features include audit trails, variable-width columns, adjustable cell alignment, and the ability to assign names to cells, ranges, formulas, and constants.

You can link graphs to worksheets, and four graphs can be displayed simultaneously. Crunch produces pie, line, bar, and area graphs.

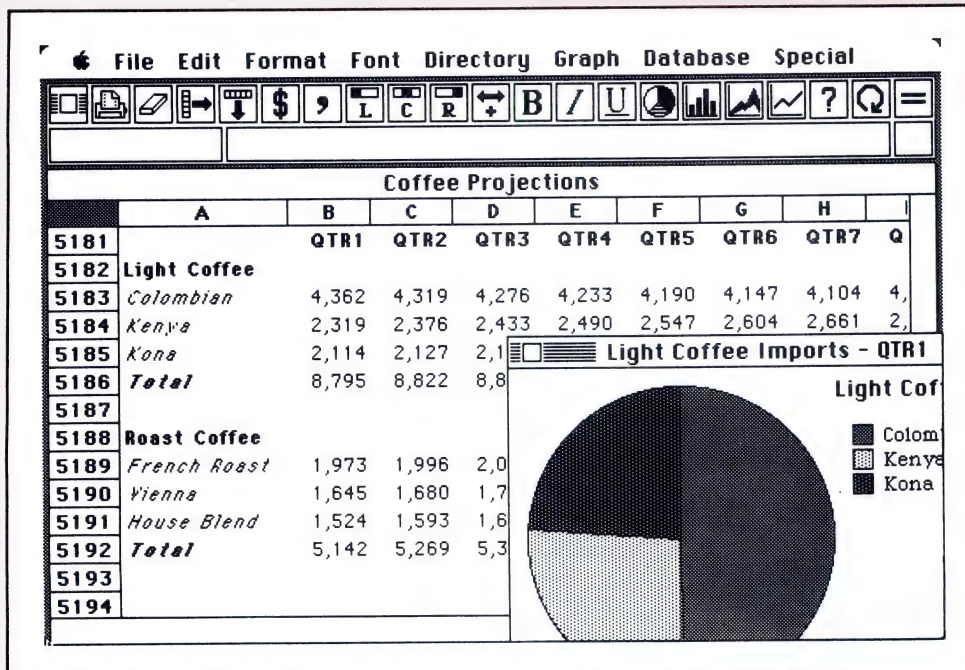
Crunch's data manager organizes worksheet rows into database records anywhere within the worksheet. You can use it to perform calculations on records, and you can sort records.

Crunch's notepad can be used for merging information with other programs and to keep 2½ pages of worksheet documentation.

Crunch uses icons, windows, and a consistent set of commands. It works with the Apple Numeric Keypad and supports the LaserWriter and the Imagewriter. Contact Paladin Software Corp., 2895 Zanker Rd., San Jose, CA 95134, (408) 946-9000.

INQUIRY 69

(continued)



Sample multiwindow display produced by Crunch.



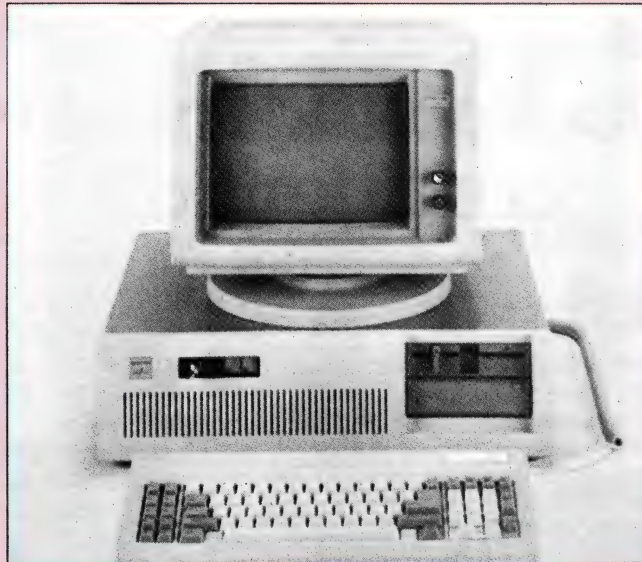
### Spectravideo Product Line

**S**pectravideo recently introduced four computers: two IBM PC-compatibles, a laptop, and a dedicated word processor. In a related announcement, Spectravideo said that it will begin delivering its MSX Express (Model SVI-738) computer in September. This computer has a 3½-inch floppy-disk drive, a 73-key keyboard, 64K bytes of RAM, and an 80-column-display capability. The MSX Express will sell for \$595.

Spectravideo's Bondwell 34 and 36 are 16-bit desktop computers that are compatible with the IBM Personal Computer. The 256K-byte Spectravideo Bondwell 34 comes with dual 5¼-inch double-sided double-density floppy-disk drives, an 80-column monochrome-monitor interface, and a Centronics-type parallel interface. GW-BASIC and MS-DOS are bundled with this system. The planned release date is in October, and the suggested retail price will be \$1795.

The Spectravideo Bondwell 36 carries most of the features of the Bondwell 34, except that its storage system comprises a 10-megabyte hard-disk drive and a single floppy-disk unit. It, too, is scheduled for an October release. The Spectravideo Bondwell 36 will retail for \$2995.

An 11-pound, battery-rechargeable device, the Spectravideo Bondwell 2 laptop computer runs under CP/M 2.2. It's built around the Z80L microprocessor and offers an integral 3½-inch single-sided double-density floppy-disk drive and



*The BT/AT is hardware- and software-compatible with the AT.*

an 80-column by 25-line LCD screen. The screen resolution is 640 by 200 pixels, and the formatted floppy-disk storage capacity is 360K bytes.

Six MicroPro software packages come with this computer: WordStar, ReportStar, CalcStar, MailMerge, DataStar, and Scheduler Plus. Options include an external 3½-inch disk drive and a carrying case. The Spectravideo Bondwell 2 should retail for less than \$1000 when it's released in September.

The Spectravideo Bondwell 22 is a 16-bit, 8088-based word-processing system with dual monitors for text and menu displays. Its 97-key keyboard has 31 software-programmable function keys and a trackball cursor controller. The Spectravideo Bondwell 22 comes with a pair of floppy-disk drives, a hard-disk interface, a real-time clock, two RS-232C ports, a Centronics-type parallel interface, and a daisy-wheel printer.

This system's word-processing software offers document merge and forms generation, as well as a con-

version program for accessing WordStar files from other computers. A clock program with an alarm, calendar, and reminder functions is provided. Shipments are to begin in January 1986. Pricing had not been determined at press time.

Contact Spectravideo Inc., 3300 Seldon Court #10, Fremont, CA 94539, (415) 490-4300.

INQUIRY 70

### BT/AT Computer Is Compatible with PC AT

**T**he BT/AT from Basic Time is compatible with hardware and software designed for the IBM PC AT computer.

Based on Intel's 16-bit 80286 microprocessor, which runs at 6 MHz, the BT/AT comes with 640K bytes of RAM, eight expansion slots, and two serial and two parallel ports. Its monochrome graphics adapter card is compatible with the Hercules card, and

the display resolution is 720 by 348 pixels. The BT/AT's 12-inch green monitor is mounted on a tilt-and-swivel base.

Mass storage is provided by a 44-megabyte hard-disk drive and a 1.2-megabyte floppy-disk drive that can read and write 360K-byte floppy disks. The average access time for the hard disk is 30 milliseconds.

The BT/AT comes with MS-DOS 3.1 and GW-BASIC, and it has an open socket for an 80287 mathematics coprocessor. Options include a multifunction board, a high-resolution monitor, and a color graphics adapter. A 70-megabyte hard-disk drive and a 60-megabyte streaming-tape backup are also available.

The suggested retail price for the BT/AT is \$4495. Contact Basic Time, Building 52, 3350 Scott Blvd., Santa Clara, CA 95054, (408) 727-0877.

INQUIRY 71

### Programmable Logic Chips

**A**ltera's EP310 is an erasable programmable-logic chip that uses Intel's CHMOS technology for low power consumption. You can program this chip to have the equivalent of 300 logic gates.

The EP310 is a 20-pin DIP device that can be programmed using Altera's PLDS2 (Programmable Logic Development System), a \$2500 software/hardware combination that attaches to an IBM PC. You can erase the EP310 with an ultraviolet eraser.

The EP310 chips cost \$11.79 in 100-unit quantities. Contact Altera Corp., 3525 Monroe St., Santa Clara, CA 95051, (408) 984-2800.

INQUIRY 73

*Continued on P. 190*



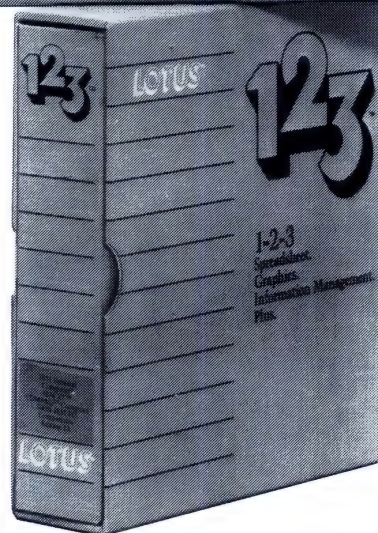
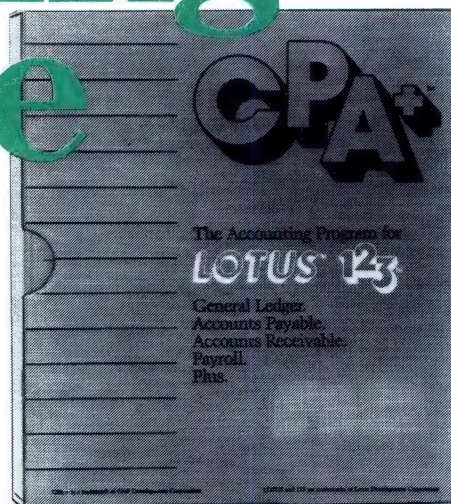
# Accounting Software

## If you already use Lotus 1.2.3.

Presenting C.P.A. +, the small business accounting program for Lotus 1.2.3. Fully featured, fully integrated and all on the one disk! Starting right now, your accounting problems may be solved forever . . . By You! Say hello to C.P.A. +, the most ingenious accounting program ever created for the I.B.M. P.C. For the first time the power of Lotus 1.2.3. is utilized in a full accounting package, one diskette integrates all modules, all files are updated automatically and reports can be custom designed. That's C.P.A. + at \$795.00 R.R.P.

## And if you don't.

The completely configured, ready-to-run System 4 and System 7 includes a full set of test data files for operator training. These systems offer Accounts Receivable, Accounts Payable, General Ledger, Invoicing or Order Billing, Order Entry, Inventory Control and powerful sales analysis. Totally menu driven with step-by-step documentation. Each module includes a beginner's introduction, and System 4 has a built-in help feature for instant answers to those puzzling questions. Works with all printers. These powerful accountancy packages will give you the information and control that you need to run a better, more profitable business. Manufactured and supported throughout Australia, System 4 and System 7 are competitively priced from \$795.00 R.R.P. At Dealers around Australia.



*All modified and approved to comply with accountancy procedures in Australia by Busiware*

*Lotus 1.2.3 is the trademark of the Lotus Development Corporation.*

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For further details complete this coupon and send it to Busiware, Suite 33, 8-24 Kippax Street, Surry Hills, N.S.W. 2010. Telephone (02) 211 1266.

Send me more information on the **SYSTEM 4/SYSTEM 7** \_\_\_\_\_ **C.P.A. +** \_\_\_\_\_

NAME: \_\_\_\_\_ COMPANY NAME: \_\_\_\_\_

ADDRESS: \_\_\_\_\_ PHONE NO.: \_\_\_\_\_

POST CODE: \_\_\_\_\_

COMPUTER TYPE: \_\_\_\_\_



# A.U.S.T.R.A.L.I.A.N L.E.T.T.E.R.S T.O T.H.E E.D.I.T.O.R

Dear Sir,

Congratulations on what must easily be the finest Australian computer magazine to date. The Australian audience has for too long lacked an international standard journal.

It is certainly a more cost effective alternative, (by the way, my subscription form is enclosed with this letter), and provides more timely information.

Keep up the good work!

DAVID LACEY  
16 Acheron St.,  
Doncaster,  
Victoria, 3108

Dear Sir,

Firstly, congratulations on an excellent magazine. With a copy of BYTE becoming an investment rather than a casual proposition these days, it is great to see such interesting articles published in your journal. If you continue the size of each issue, content and standard as in this first issue, you must have a winner on your hands.

Secondly, as a senior university student, I have access to and must make use of a VAX mainframe. However, as I wish to do my assignments, etc., at home, I would like to use a cheap computer as a remote terminal. The computer I have in mind is a Commodore 64. Could you please tell me if any software exists, or if it is possible to make the C64 emulate a VT100 terminal (obviously with a suitable modem). After asking at a few computer stores, I am

still without an answer.

Again, congratulations.

Yours in anticipation.

PAUL LITTMAN  
7/6 Liverpool St.,  
Rose Bay, N.S.W. 2029

Dear Readers,

*Could several of you please send to Paul (or to JUST COMPUTERS) various solutions for his requirements.*

F.O.H.

Dear Sir,

Regarding your request for comments and contributions, my comment is congratulations! — your first issue will be a "hard act to follow".

I particularly appreciated your general support for something between the home/games system and the IBM compatible, Pages 29, 47, 177, 181, in particular. For us in-betweens, there is no doubt that a continuation of CPM, Z80, etc., is pretty important.

NOW! May I suggest you consider an important extension of this willingness to explore and report on the middle ground? I believe there is a whole market segment presently being ignored by both the media and the computer systems producers. This is the VERY Small Business (VSB) market and its Owner-Managers (VSBO-Ms).

Keep up the good work.

OWEN DIBBS  
Accredited Consultant,  
Small Business Development  
Corporation,  
Boroloola,  
Pine Tree Dr., PS 1634,  
Cooroy, Queensland, 4563.

Dear Owen,

*Our columns are open for the exploration you sug-*

*gest. Will you be the first, or must we look for Bourke & Wills? Come on, now, out there — don't wait for John Cleese to do your business commercials. Let some teeny-weeny, about the size of our business, fire the first shot of many. What IS really wanted on this important topic?*

F.O.H.

Dear Sir,

I love the magazine and wish you success.

It has been fascinating for me to use my PC at work to solve office problems, and each time there is a happy feeling of achievement.

How sad I felt, though, to see the photo (page 37) of Dr George Gander using a home computer to check temperatures of his rabbits — just look again at the photo — what a ghastly life is theirs! All this high tech and we are still experimenting, just as in the bad old days.

EVELYN SPENCER  
9/188 Bronte Rd,  
Waverley, N.S.W. 2024

Dear Evelyn,

*You embarrass us — you are so correct. We were too rushed to notice, but perhaps the ultimate good will prevail. I know my broodmares have a happy life, though, and have been known to eat "better" in some years, than has their owner.*

F.O.H.

Dear Sir,

I have recently read many of the fine articles in the very first edition of "JUST COMPUTERS" and must congratulate your staff's great effort with this newest magazine to the Australian computer marketplace. I own two home computers at present and I am quite often in search of computer articles relating to either of my computers, and I was rather pleased to see that one of my computers was covered in a comparison article, namely "Buy Australian". I own the Microbee side of the comparison and, of course, I agree with the author, although I felt he was very impartial. The second machine I own is a Texas Instruments 99/4A computer, which to my mind, is one of the best all-round general micros in Australia. It was to me, along with thousands of other owners, a very sad and regrettable day when T.I. America pulled out of the home computer market. But that is history now.

I wish to convey a few personal thoughts of mine towards the new magazine of yours, as I write a small newsletter for the 99/4A user group in Tasmania, I know how constructive criticism is most welcome. I should have said a little more in my opening comments of the quality of the volume 1 No. 1 edition of "JUST COMPUTERS", but too much can go to one's head and this could lead to No. 2 not being better than the first. My comments follow.

I would like to see the great and wide-spread



coverage kept up.

I would like to see some articles relating now and then to some of the many computers that have bitten the dust. We users of such machines get tired of hearing the IBM, and clone, never-ending story. Please try to remember that we all went through that with the APPLE saga.

I would like to see a small section devoted to each individual computer. I know that is almost impossible with the number of computers on the market, nowadays, and perhaps you could at least enquire from the various user groups as to who would be prepared to write such a column concerning their computer.

I would like very much to see the advertisements within your magazine, which were many and pleasing, to carry as many computer brand names as possible where the particular peripheral they are trying to sell is compatible with various computers. That would be the tallest order of 1985 for anyone to ask, but many companies, who do advertise, do not give ANY indication at all as to the compatibility of their products with even the most common computers available. A phone call quite often draws a blank, also.

I would like to see "JUST COMPUTERS" continue with the fresh and individual approach that you have shown in the first edition, and NOT become just a follower of other monthly computer magazines.

I will be looking forward to the next edition of

"JUST COMPUTERS" and must say, in closing, that I do not expect the price to remain at A\$1.95 for long, considering the quality and quantity of the magazine, at present, it must be the very best buy for ANY computer magazine in Australia.

R.C. SHEPHARD  
1 Benboyd Court,  
Rokeby, Tasmania. 7019

Dear R.C.,

*As treasurer of J.C., it would be inappropriate for me to comment on the final speculation as to a cover price rise or fall, or even on next month's A\$-NZ\$ exchange rate.*

*We shall endeavour to meet as many of your suggestions, for which we thank you, as we find practical. Perhaps, advertisers could assist with the proposals in your third last paragraph.*

F.O.H.

Dear Sir,

Just as your publication, "JUST COMPUTERS" is a first, so too is this letter: I have never before written to any publisher of any magazine as I do now in response to an almost compulsive urge to offer my congratulations for a job well done.

However, being one who believes that modesty is almost immoral, it is difficult for me to let this thing pass without comment. When a man (or group of men and women!) set a goal for themselves and then plan, labour, create and, despite doubts and the

many drawbacks which seekers and dreamers are fated to endure, manage to produce something of which they have every right to be proud, then modesty should not be permitted to taint such endeavours. Personally, I do not have the ability nor the desire, after having achieved something of value, to bow my head in humility and accept the plaudits of the public for having been mediocre in that which I have accomplished. Too many people are content with their mediocrity or are too quick to praise those whose endeavours are worthy of mediocre applause: so, Sir, to Hell with Modesty! I applaud your endeavours for they have not been tainted by mediocrity, but have almost earned the badge of excellence.

And that, I am most certain, is only an achievement in which time and inexperience co-operated to confound your present efforts.

I enclose a cheque for my subscription to "JUST COMPUTERS" and that, I can assure you, is a further indication of my esteem because, despite being an avid computer buff, I have never before subscribed to any computer magazine.

I thank you for your time and your patience, Sir, and seriously hope that my levity has not been misjudged: I most ardently hope that my comments on your magazine are not taken lightly, because I will not retract a single word of it and hope that, in time, I will be able to say that what

was almost excellent, has now lost its adjective.

REV. DOUGLAS I. SPENCER  
P.O. Box 306,  
East Melbourne,  
Victoria. 3002

Dear Rev. Spencer,

*Thank you for your faith. Your comments are valued and happily received.*

F.O.H.

Dear Sir,

Wow! What a great new magazine! I anxiously await the second edition. I am a year 11 student of Mudjee High School and have been involved with computers for over three years now. When I first started out I bought myself a Tandy TRS-80 Model 1, which I later expanded to 16K, Level II BASIC with upper and lower-case. About 18 months later, for some still unknown reason, I bought myself a Dick Smith VZ200. Recently, though, I have sold both of these computers and have purchased an Amstrad CPC464 computer. My main reason for getting the Amstrad CPC464 was to allow me to use some of the skills that I had obtained from working on the other computers, with the hope of making some money.

I have worked with many computers and programmed in several different languages. I have had most of my experience with Z80 equipment, doing a large amount of my programming in Z80 Assembly/Machine Code. I have



also done a reasonable amount of programming for CP/M systems.

My main reason for writing, apart from wishing to congratulate you on an excellent magazine, was to find out if you would be interested in my writing some articles for the magazine. I feel that a series of articles about some of the features of the Amstrad CPC464 could be very popular amongst the Amstrad CPC464 owners who read your magazine. How about a review of the Amstrad CPC464 to start-off?

I would also be interested in writing any other articles that you feel I may be qualified to write. I could also write reviews for Amstrad CPC464 software as what software I don't have already could be borrowed from the local AWA dealership, where I work occasionally.

May I suggest as a feature in an up-coming issue, an article concerning some of the career choices available to the "Whizz-kids" of today. For example: I am interested in getting into computer journalism, but have no idea of what qualifications are required, or what job opportunities are available. I would be grateful for your personal advice on this matter.

Once again, thank you for the most informative and value-for-money Australian magazine I have read to date.

BRUCE DANIEL  
5 Lewis Street,  
Mudgee, N.S.W. 2850.

Dear Bruce,

Thank you for the compliments and we shall try to

improve. We would be most interested and pleased to receive from you articles based on your already considerable computer experience. We would also look to other readers to take up in letters to the editor any of the many forward-looking points raised in your letter.

Please also refer to Paul Beaver's article on page 91 of this issue regarding the submission of articles.

F.O.H.

Dear Sir,

In October, last year, I purchased a Tandy TRS-80 Model 4P computer. I have found that the software available for this machine is scarce, if you want to run under model 4 mode (TRSDOS six).

The software I have purchased to run under this mode is rather complicated and has a manual that has about 300 pages, which is set out poorly. This also contains a whole heap of jargon about how the program works instead of getting down to the facts on how to use the program.

I have talked to many people about this at computer user groups and they say the same thing, i.e., that they like programs to be easy to use and the manuals to be direct and to the point. Because of this problem, I have had to learn how to write software and write the programs myself.

The programs I have written are simple to use and the manual would be

up to 17 foolscap pages maximum. These have created great interest amongst people who have used them.

I haven't marketed these programs as I'm still trying to work out how to do so. Should I sell them through an existing software firm, or should I sell them myself, or to a magazine, etc.

The problem is that I don't know how to go about selling these programs to a limited market and how to market them. I have contacted many information services, including the government agencies, to no avail.

I have read several other articles in other magazines about selling software but they aren't very informative. I think many other people would be interested in articles of this type and how to go about doing this.

I wish to congratulate you on your magazine which is up to date and to the point.

It seems that your magazine favours computers like the IBM PC's, just by looking at the contents. I hope that this trend will not continue in the future, as we users of the 8 bit computers like the TRS-80's will be left out.

I wish you all the best with your new magazine.

MARK WILLIAMS  
P.O. Box 52A,  
Fairfield Heights, N.S.W. 2165

Dear Mark,

You seem to have more problems that our production department — but all are eventually overcome.

Would readers please help with their experiences and J.C. will not overlook the needs of the 8 bit com-

puter masses. Your problems should be overcome if some of the advertisers in this issue read this letter — or, perhaps you could contact them.

F.O.H.

□□□□□□□□□□

## Readers

Don't you think that

**JUST**  
COMPUTERS

offers the best value in computer magazine reading, at A\$1.95 or NZ\$2.95, on the news stands?

(Please note that J.C. is an identical issue each month in both Australia and in New Zealand).

It is supplied even more cheaply by direct subscription. Why not use the subscription card in this issue?

□□□□□□□□□□



# JUST COMPUTERS

This is the second issue of JUST COMPUTERS and there are still some who have not yet taken out an annual (or a two or an economical three year) subscription.

*My goodness me!*

With 11 issues a year (we even stop for your holidays), J.C. will be providing nearly three thousand pages of computer concentration for only A\$19, or NZ\$29, every 12 months.

*My goodness gracious me!!*

Hundreds have already signed up for years ahead, after just one issue — in fact, about 1000 person-years of paid contributions have been received.

*It must be good —*

*It just is —*

*It's JUST COMPUTERS!!!*

By popular acclaim from our readers, in letters received, some of which are published in this issue, many would have JUST COMPUTERS as the highest-quality computer magazine in Australasia. As it is also the biggest, and has the largest circulation, it is recommended as a fine home-bookstand addition for your growing and enquiring family or

A HEAVYWEIGHT BIRTHDAY OR XMAS PRESENT.

*My goodness me — never mind the chocolates,  
Queensland must subscribe!*

A TEAR-OUT SUBSCRIPTION CARD IS IN THIS ISSUE WITH READER SERVICE CARDS



# THE OLIVETTI/AT&T IMAGE CAPTURE KIT

By CLAUDIA IVANOFF

---

Here is something really new in personal computing. The Sesame Street generation no longer have to leave Oscar the Grouch, Kermit the Frog or the Tweedlebugs at home when they go out into the cold, cruel world of business. Their favourite video friends can hang out in the office. Any image which can be captured can now be manipulated on the Olivetti personal computer.

Three years ago, videodisk technology nudged its way into computing at great cost to the user. The early interactive videodisk/computing systems were used to train pilots in the Hawk missile project, as well as to illustrate diagnosis routines and clinical procedures to UCLA (University of California, Los Angeles) medical students. For only US\$250,000 *anyone* could own and operate one of these types of setups. The video images at that time cost thousands of U.S. dollars to produce and the videodisks (looking like silver record awards) cost US\$100 each. Now, the same functionality, easier indexing, plus editing capabilities are available in a low cost kit from Olivetti.

Well, that's good news for medicine and warfare training (one

business supporting the other anyway) but, you might ask, what does ulcer diagnosis have to do with me?

In business, the most common information which is easily explained, grasped, turned around and worked on is an image. Images play an integral part in business life, explaining a concept or substantiating a viewpoint. How would you like to be able to send a full colour birthday card electronically to someone? What about computer dating? You could actually "date" without ever meeting in person! Horse betting? See the horse before placing electronic bets! Enough! Suppose we get down to real business.

This system has enormous potential limited only by imagination. Advertising and film production executives, viewing the setup at my office, were agog. They could see that this single system, one which operates on visuals as well as words and numbers, could solve a lot of problems — expensive problems.

□□□□□□□□□□□□□□□□

*Claudia Ivanoff of Ivanoff Enterprises Pty. Ltd. specialises in information technology consultancy.*

It could handle the accounts under an MS.DOS application and work as a creative director's assistant as well. (If you ken how chintzy these industry folk can be, you will understand that the Olivetti kit packs a wallop!)

## The Image Capture Kit

Called the Olivetti AT&T Image Capture Board (ICB), the newest application from this "top 3" personal computer manufacturer is a kit. It includes both ICB and Video Display Adaptor (VDA) boards, software packages called "ARTIST" for each process, and menu driven instructions, so that any photographic image can be captured, digitized and edited. The results are startling, opening up the photographic imaging realm to the personal computer user. What previously required videodisk technology, or expensive film recording equipment with dedicated minicomputer processors, is now available on the Olivetti M24 personal computer and compatibles.

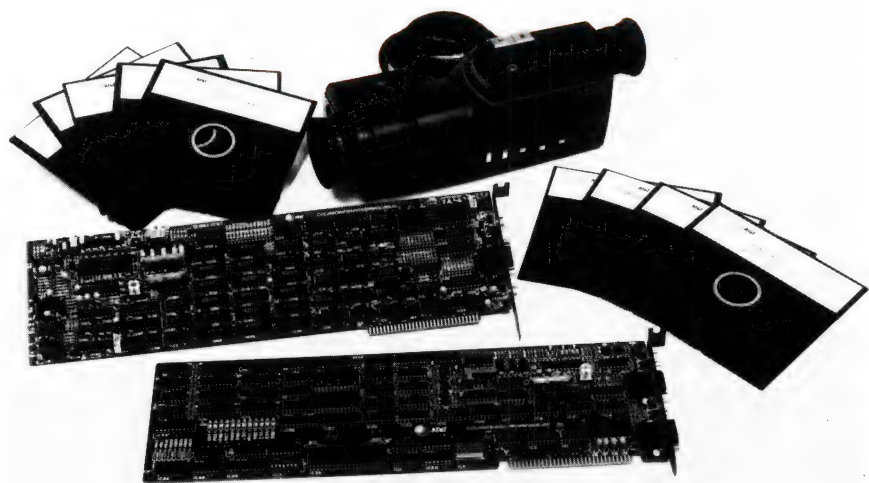
## Functions of the System

The ICB captures and saves video or live photographic images. The RGB





*The test system.*



*The Image Capture Board with the NSTC camera standard is required.*

monitor displays the current image, which can be a succession of one-second "live" photos, a split screen of four live or video images, or a still shot from an existing video unit or from the camera in real time. Each pixel (dot) of a captured photographic image is addressable on the RGB monitor for editing, using pre-set geometric shapes, text and a palette of 32,768 colours. In addition, it can be cropped, shrunk, stretched or moved around on the screen until the image meets user requirements. Images are stored in ICB file format (exactly like a television image) and can be converted to VDA format (of 200 x 256 resolution) for manipulation, a simple process carried out by three commands. Central casting agencies don't have to wait for 8 x 10 glossies because their clients can "peruse" the potential talent bank on a personal computer. Updating portfolios can be arranged in a single screen layout.

The VDA was designed to display high-colour resolution images using 256 of 32,768 possible colours. The ICB was primarily designed for real-time capture of video images (NTSC format, the U.S. standard). The ICB memory is dual ported so that programs running on the PC can access, modify and retrieve information while the ICB maintains the display output. The use of row-addressable RAMs (RARAMs) reduces memory contention to less than one per cent.

All functions run from simple commands and pop-up menus on the system monitor or RGB screen. After 10 minutes of training, the reviewer was able to work the system satisfactorily. The functional commands are carried out instantly. Once an image is altered, it can be saved under any name. The system automatically supplies the VDA or ICB suffix for the user.

The system operates under MS.DOS by writing an autoexec environmental variable to set the ICB jumpers. Documentation is comprehensive for those who wish to program in this application kit which includes instructions for setting all control registers.



# *“Simply the most powerful multi-user micro available today!”*

*Synax super micro-computer systems allow you to add extra users without sacrificing performance.*

Join the growing number of satisfied Synax users. Enjoy the *superb performance* and *high reliability* of our computers. Benefit from the *expertise* and *support* upon which Synax prides itself.

Synax Systems and its dealers can provide real solutions to your particular business requirements.

Because of our *multi-processor architecture*, we not only deliver minicomputer performance at microcomputer prices, we also provide you with the ultimate in expandibility *without* performance degradation.

Hardware features include a choice of 8 and 16-bit processors (Z80B/Z80H/80186/80286) large hard disk drives, and *economical tape backup*. We support the TurboDOS operating system (CP/M and MS-DOS compatible) as well as Concurrent PC-DOS. We also provide *PC networking* solutions.

If you'd like some more information on Synax computers call us now.



***Synax***

*Excellence in Computing*

SYNAX SYSTEMS PTY. LTD. (02) 467 1166





## Targetted Users

There are numerous occasions when imagery best expresses the concepts which have to be executed in some final form by someone else. What better way to explain what the desired result should look like? Using programming tools, the Image Capture kit can be used to create new applications, combining video images and text.

For example, advertising agencies could quickly draft storyboards or presentational slides for client reviews and other creative work which is now extremely expensive and time consuming, such as planning camera angles for a film. Video games with highly realistic presentations could also be designed on this system, eliminating complaints about "Lego" images. Training sessions combining image and text could be programmed for a variety of subjects, where images are extremely important, such as in medicine.

Bread wrappers could be designed around the actual loaf on this kit. Then, the Artist program could make it look tastier (or draw on mould, etc., if the competition's loaf is involved in the ad). Motivational images (a castle, the family, a 1933 Jaguar) could be displayed on the screen while the writer creates copy. The Queen's own speechwriters could now write around the very image of her royal highness. Because each pixel in the image is addressable for changing colours, eerie images could be conjured up for special effects planning. The Mona Lisa could have her moustache removed digitally, and travel around Australia on Telecom lines, saying "hello" to other computer users. Movie posters, cereal boxes, or even fabric patterns, could all be designed on this system.

The kit is currently being demonstrated to security and law enforcement agencies to use for "Mug shots" and descriptions in police detective work. These image/text data files would then be communicated to other personal computing systems throughout the world in short time and viewed through an RGB monitor.





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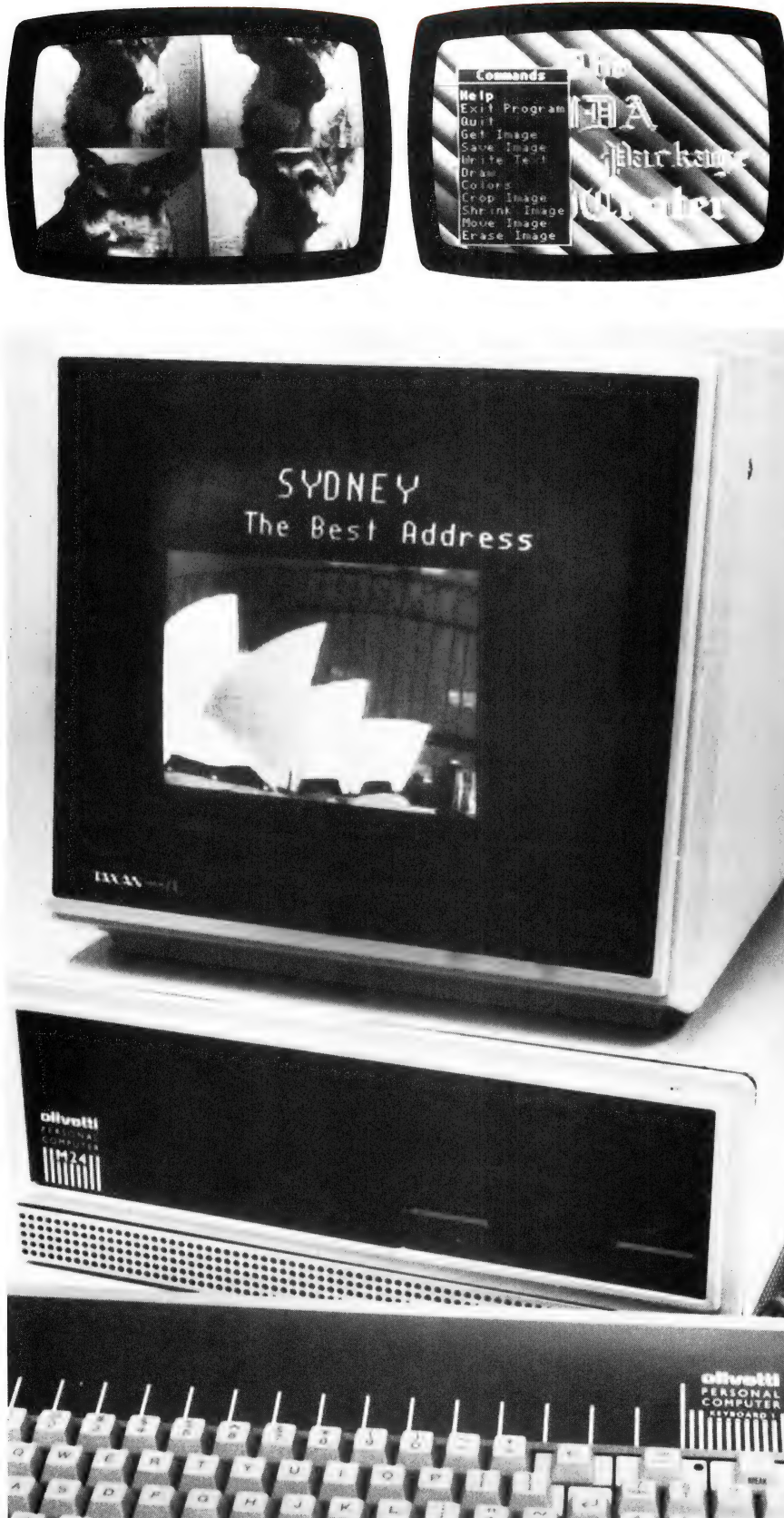
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The compression technique was developed by AT&T for sending images over telephone lines and uses a combination of traditional compression techniques, such as Huffman and run length encoding plus a proprietary technique AT&T calls EPICenter (Electronic Photography Imaging). This compression happens in about 10 seconds. The number of colours (i.e., 1379 in the ICB image) is reduced to a maximum of 256 colours which can still be modified within the VDA.

The long-promised and not delivered enhanced qualities of videotex ("Lego-tex") images cannot compare favourably to the facilities of this Olivetti/AT&T Image Capture kit.

Potential users would be in the advertising, modelling, casting, real estate, security or video image-making businesses and clever high-tech artists maybe added to this initial list.

## Inside the System

How does this work? The NTSC video capture camera is a fascinating piece of gadgetry in itself. Inside the view lens is a tiny monitor (about the size of an average watch). Focus can be automatic, continually self-adjusting as the user pans the viewing area. After an image is digitized, compressed and stored as a 200 row by 256 pixel image in 100K bytes of memory on the ICB, it is converted for display on the VDA and the resultant image requires 50K bytes of storage, and when compressed the resultant file is approximately 3K.

Once the ICB image is converted, the user must change monitor cables in the back of the processor and then the RGB screen displays digitized images from desk files for manipulation.

The Test System includes an Olivetti M24 with 640K memory and 10 M-byte disk plus single floppy drive, a monochrome monitor plus RGB monitor, a Panasonic NTSC colour video camera, power supply and transformer (plugs will be modified for Australian users). □□□□□□



# BUY AUSTRALIAN — ADDITIONAL

By STEVE KEEN, B.A., LLB, Dip. Ed.

Significant changes have been made to the "Kookaburra" range since my review in the June issue of Just Computers. For a start, the price has been dropped significantly. The basic 16 line 96K RAM machine is now A\$1,998 including tax, while the upgrade to a full 256K will raise the cost to A\$2,769. That is a drop of A\$1,300 on the old price, giving it a price advantage of the order of A\$2,000 over the HP110. Prices to University and Government purchasers are much below those already-competitive levels.

Secondly, with a new CAD board, Time claim a battery life of eight hours with continuous use, which is more than adequate to classify the Kookaburra as a true portable. Few microcomputers get eight hours use without a break and a normal overnight recharge should be enough to guarantee that the "Battery Low: Please recharge batteries" warning is rarely seen.

The Kookaburra has always had a disc drive unit — called the Magnum Expansion Box or MEB in the days of Dulmont. Now there are three disc options: the MEB, a plug on and battery powered 3½ inch drive with 720K storage capacity, and a 10Mb Hard Disk. The MEB's price has been dropped to A\$1,188, while the top of

the line hard disc (not yet off the production line, but available shortly) will sell for A\$2,438. Considering that both units include 128K system RAM, and the hard disc includes a 360K floppy, these prices are extremely good value, and represent a true portable. A complete system, consisting of a 256K RAM Kookaburra with twin 360K floppies would cost A\$3,957; with a 10Mb hard disk, A\$5,207. Some portable computers sell for as much, without long term data storage.

A large sale to the Department of Taxation has finally provided the local market support that the Kookaburra lacked in its first incarnation. At these prices, any ordinary consumer who followed Tax's lead would be demonstrating a good eye for value, as much as patriotism.

More use of the Kookaburra has considerably enhanced my opinion of two of its built-in programs, MagCalc and MagTerm. MagTerm is derived from Perterm, so it's no wonder that it is a good performer. MagCalc was written locally, specifically for the

Magnum, and while it does not have the speed of Lotus 123 (as my comparisons with the Hewlett Packard 110 demonstrated), it is a superbly constructed spreadsheet which should be easy for the novice to master.

All its operations are performed using the function keys and self-explanatory mnemonics. For example, F2 is labelled "COL". Pressing it brings up a secondary menu at the foot of the screen: "Column: (I)nsert (D)eleate (M)ove (C)opy (W)idth (U)n(L)ock?". Pressing W for width generates the prompt 'Enter column width (0-70):'. At any stage, the operation can be aborted by typing the escape key. None of this is remarkable in spreadsheet terms, but it demonstrates a rare level of command simplicity and consistency. The program does have a couple of unique features too, such as the ability to name the actual rows and columns of the spreadsheet (so column labels such as "B" are replaced by a user-given label such as "Change over 1983/84"), and "indirect references", so that [D32] means "use the same formula as in cell D32".

About the only annoying feature is the need to press a function key (F6) to indicate whether an entry is text or a formula. However, you can adjust to one quirk. □ □ □ □ □ □ □ □

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*Steve Keen is an economist with the Australian Department of Trade.*



# A Sunrise Industry with a Winning Difference

By DAVID GRAY

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It is an enjoyable experience to spend a day with computer designers and manufacturers who have produced an exceptionally good computer.

"Impressed" is an understatement to the way many of us feel when that computer is designed and produced in Australia.

The AED Universe supercomputer is such a machine — with mind blowing speed and processing power along with oodles of software compatibility (it can even run "Big Blue's" software) at a competitive price.

Before we go into more technical detail, and there's lots of it, let us look at what sunrise industries really are.

A sunrise industry, essentially, is an Australian home-grown industry that employs local talent in all aspects of the creation of a product, from design/concept to assembly/production. Odd components may be sourced overseas, e.g., processor chips, but sunrise means it's all Australian.

Japanese and U.S. governments seem to promote and encourage high-tech achievement. Australian governments do not appear to be adopting the same enlightened attitude.

An American or Japanese computer designer has four big advantages that are based on luck and good fortune rather than any demonstrated competence:

- (a) Money for R&D through receptive bankers, financial houses, investors and the all important, substantial government grant.
- (b) A massive domestic market base from which to commence marketing. A market that is big enough to tolerate "also rans".
- (c) Substantial export incentives with which to address technology starved overseas markets.
- (d) A community attitude that home grown is good.

What does this mean in relation to Australia?

It means that when Australian computer designers get to the drawing board they cannot afford to be just as good as their U.S. or Japanese counterparts, they have to be better — much better, in order to offset the disadvantages of a small and competitive local market, along with a sadly apathetic government.

As a result, when an Australian computer manufacturer can lock horns with the bigger overseas manufacturers, and win, it is time to take a good long look.

A problem many purchasers of a computer have is that their purchase

can become obsolete. The Supercomputer defies this by an R&D program called "OBSOLESCENCE IMMUNITY" which basically means that all the essential performance features of the AED Supercomputer are upgradeable, i.e., processor speed, expandable buffers for internal transfer of data, controllers to accept new forms of bigger and faster data storage.

This is an obvious big benefit to AED's current 400 plus user list and a very pleasant bonus to new customers.

Maintenance and PCB upgrade are, to say the least, a simple operation; the processor is easily accessible and displays its 20 S100 board slots (that's an incredible 14 spare slots for heaps of extra memory and peripherals as the system grows) to a maintenance engineer making average repair time fast and effective.

Reliability in computer equipment is something that most of us thought the Japanese had locked up. Not so — AED have attracted customers in South-East Asia and South America, as well as Australia, and reliability has been a key issue. AED provide all service direct and third parties are not used. AED offer a 12 months' warranty as standard and that spells manufacturer confidence.

How would the office user relate to the AED Supercomputer?

□□□□□□□□□□□□□□□□

*David Gray is a marketing representative, Data Peripherals Department, Thorn EMI Technology.*



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add, if you are an  
established writer,  
or widely  
experienced in any  
aspect of the  
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sections of the  
computer industry,  
or have superior  
knowledge of a  
specific area of  
computer  
technology or  
commerce, then we  
need your articles  
(short or long) and,  
we hope, the  
exposure we can  
give will be  
beneficial to your  
career. We also pay.*

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appeal, we should  
increase the sizes  
of our post office  
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The Supercomputer terminal currently comes with a green screen. Its resolution is no better nor worse than any other on the market; it can be swivelled around to achieve maximum operator comfort. I found the green characters quite comfortable to work with and the whole configuration quite pleasing.

The Supercomputer keyboard is a little wider than the usual computer keyboard, but only because the designers themselves preferred to have function keys, numeric keypad, alpha/word processing keys more distinctly separated from one another.

All in all, both the screen and keyboard are comfortable for working. There are moves underway at AED to manufacture their own terminal screens in the near future rather than purchase them through an OEM. They are also considering having a keyboard that, although it still keeps groups of keys distinct from each other, will be a little less wide than the existing one.

Close on a A\$1 million and over 80,000 man hours in R&D have gone into making the Supercomputer we

see today, which is manufactured at AED's 6000 sq. m production centre in Sydney's western suburbs.

I looked for some negatives to write about so as to balance out a long list of positives and I was hard pushed to find any.

AED appear to be doing all the right things, producing a quality product, with software compatibility and good field support.

So, strangely, my criticism is this. AED have been around for over five years furiously spending their profits on further R&D which means a great product at a great price, but not many people know about it. Aesthetically, the Supercomputer is neither novel nor exciting, which tends to detract from the great box of goodies inside. Furthermore, AED, in my opinion, need to get out into the marketplace and start telling people that Australian technology can be just as good, if not better, than overseas technology. I hope AED do make some noise and raise their profile because I believe many people will think as I do, that AED is an Australian computer manufacturer with a lot to offer. □□□□□□□□

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AED offer a single user, or up to six user, system.



# AN INTERVIEW WITH AN AUSTRALIAN COMPUTER ENTREPRENEUR

*Further to the previous article "A sunrise industry with a winning difference" JUST COMPUTERS instigated the following interview with WAYNE WILSON.*

Thirty-two year old Wayne Wilson and AED are both important and interesting to *Just Computers* and, expectedly, to many Australians. Apart from being managing director of AED, Wayne Wilson is one of the few innovators in Australia's sunrise industry. Wilson's career began with S.T.C. and in 1979 he brought AED on to the computer manufacturer listings.

The motivation behind starting AED and conceiving the supercomputer came from Wilson's "Concurrency Concept", that is a (micro) processor that can invest more than one program at a time. Revolutionary stuff in the 1970's — today, no big deal. Six years on, what are Wayne Wilson's plans? Can we look forward with anticipation to a 1985 equivalent to concurrency?

**Just Computers:** What is your machine philosophy?

Wayne Wilson: "That it is economically upgradeable; there isn't anybody who owns an AED computer that couldn't upgrade it simply and economically."

**Just Computers:** How substantial is AED in dollar turnover terms and what is the expected growth?

Wayne Wilson: "The first five years of operation saw a growth average of 60% per annum. By 1988/89, and if current trends continue, we should be a A\$20 million company."

**Just Computers:** How do you sell AED computers?

Wayne Wilson: "The general style of this company is that the people are not sold an AED computer, they *buy* an AED computer through our technically informative type of advertising, as opposed to hard sell, and through our soft sell

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type booklets. People come to the conclusion that it is one of the better machines and decide to buy it. So our computers are bought — not sold. That pattern is changing, we have to get a better marketing effort together, but the general growth of the company has been people seeking us out."

**Just Computers:** What role does your partner Roger Jones play?

Wayne Wilson: "Roger completed a degree in electrical engineering and has a strong interest in electronics. We have worked together previously over a period of two to three years and developed a mutual respect for each other in engineering ideals. Since we joined together, we haven't looked back. I guess it's fair to say that I am mostly involved with design and Roger with engineering."

**Just Computers:** Where does AED spend its profits?

Wayne Wilson: "That's easy! Two-thirds is used for research and development, the remaining one third goes on all the various overheads."

**Just Computers:** How would you describe concurrency?

Wayne Wilson: "Concurrency, basically, is the ability for the screen of the computer to run a number of different programs at the same time and the screen to be like a window into those different programs. It's like an office desk with four computers in the office, with the screens for those computers all being on the desk in front of the user at the same time. Word processing could be interrupted by a phone call, say for an appointment, which involves a diary on another terminal. This can be arranged without time delays, and the word processing then resumed. Concurrency is where you take the one computer, and, in a time share way, run the four programs separately and have just the one screen, but you have an imaginary switch, so that you can switch the screen to one of those programs. That switch is usually a button on the keyboard. So you can be word processing, and then press a button on the keyboard, and you're in your diary. It allows you to have various items of paperwork open at the same time and have instant access to them.

Traditionally, before concurrency, people had to use their computer for only one task. Most major operating systems in the world now have concurrency — MS does, CPM 86 does, Apple Lisa does. It's becoming the norm. In fact, it's coming to the stage where nobody would want a machine that didn't have it."

**Just Computers:** What's the difference between MULTITASK and Concurrency?

Wayne Wilson: "Multitask is where one user can do more than one task, but not where that involves user interaction. Multitasking is where, e.g., you can start printing a report, then detach your terminal and start doing some word processing. Concurrency is where the screen and computer jump from various tasks. The screen is maintained at its proper status."

**Just Computers:** What are your future plans?

Wayne Wilson: "We are going to build a marketing organisation within our current structure. We used to think we didn't need salesmen. Now we are at a stage where salespeople can provide a necessary service and assist the company in moving in the right direction. We are going to continue our commitment to Research and Development. In fact, we're expanding that. Next year's Research and Development expenditure will be double that of this year. Our overseas marketing effort is due to increase."

**Just Computers:** What are your main aims for 1985 and 1986?

Wayne Wilson: "To offer a mini system at a micro price, although this is probably the way the market is going, anyway."

**Just Computers:** What is obsolescence immunity?

Wayne Wilson: "In over four years, none of our customers has traded nor thrown away our computers — they just upgrade the same computers!"

**Just Computers:** Is that a principle in your engineering philosophy?

Wayne Wilson: "Yes, very much so. Any AED customer must feel confident that the purchase can be upgraded to leading edge technology, year after year."





# C.P.A. + THE FULLY INTEGRATED LOTUS 1.2.3. ACCOUNTING PACKAGE

By MARK MILLER



C.P.A. + is a fully integrated accounting package that works in full synergy with Lotus 1.2.3. For the first time the power of Lotus 1.2.3. is utilised in a professional accounting package with all modules contained on one diskette. C.P.A. + is menu driven and requires a minimum of 256K RAM to operate. It is loaded, with Lotus 1.2.3., into the RAM of the computer. To get the C.P.A. + command menu the “\” key is pressed; to get the Lotus 1.2.3. command menu the “/” key is pressed, thereby enabling users to move freely between C.P.A. + and Lotus 1.2.3. All C.P.A. + accounting information is stored in the Lotus 1.2.3. spreadsheet format so that users can access C.P.A. + files using the Lotus 1.2.3. File Retrieve function for quick data manipulation and viewing of accounting data.

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- (d) The Sales Journal: records all credit sales (debtors’ transactions).
- (e) The Employee Payroll Journal: records each employee’s vital information for payroll purposes.

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*Mark Miller is a chartered accountant and consultant to Busiware Applications.*

- (f) The General Journal: used to record transactions that do not “fit” into any of the above journals but require posting to the general ledger.

With the C.P.A. + you will be able to enter, edit, delete and sort the data in these journals quickly and neatly. Once the information has been entered, C.P.A. + can manipulate it in a number of ways, using a special forecast module to help you analyse current, and forecast future, business trends. The forecasting function is especially useful for budgetary purposes as it projects future business activity based on past activity, as recorded in the journals of original entry.

- (g) The Names Journal: all names and addresses of employees, creditors and debtors are entered in this journal. C.P.A. + consults this journal when printing cheques, mailing labels, envelopes, debtors’ invoices and statements and creditors’ remittance activities.
- (h) The General Ledger: contains the chart of accounts with beginning and ending period balances. Posting to the general ledger is facilitated via the



abovementioned journals of original entry using either the account number or the account description as it appears in the chart of accounts.

- (i) The final area is the worksheet area where transaction manipulation, forecasting and report generation occur.

As with Lotus 1.2.3., all C.P.A. + program and data files are loaded into the main memory of your computer. Thus, the memory capacity of your computer determines your transaction constraints. The table below is a general guide to these memory constraints.

The accounting period may be a month, quarter, year, etc., depending on the number of transactions and the memory in your computer. Thus, for a small business with 640K memory, a period might constitute the whole financial year. If you find that you are running out of memory and all transactions for the first seven months of your financial year are stored in the worksheet, all you need do is a period update to "free" some memory. What constitutes a period is entirely your choice. It could be the first month or two, three, four, five, six or all seven months. C.P.A. + will simply ask period ending date and perform

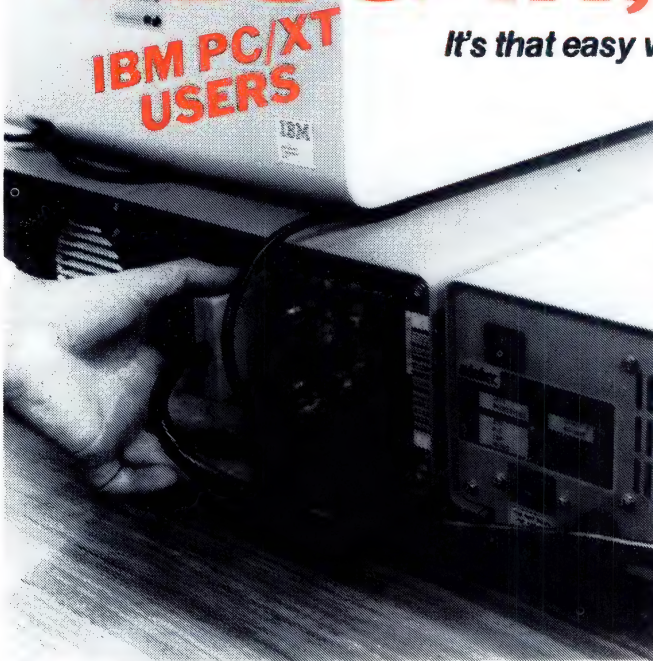
a period update for the period stipulated.

The C.P.A. + reporting function has the ability to generate a wide variety of reports from any of the journals mentioned above and from the general ledger. These reports can be detailed, summary, aged and Financial Statements, including Income Statements, Balance Sheets and Financial Ratio Analysis. In addition, many custom reports can also be created for any period or date range, at any time. Once C.P.A. + has created the desired report, it is very easy to manipulate the report with any of the Lotus 1.2.3. commands if such manipulation is desired. All reports can be viewed prior to printing by scrolling through them with instant graphs available for all summary reports.

MAXIMUMS PER ACCOUNTING PERIOD	AMOUNT OF MEMORY IN YOUR P.C.			
	256K	384K	512K	640K
Total number of entries on worksheet	800	2000	3600	4800
Entries per journal per period	100	300	500	700
Chart of accounts: number of accounts	100	300	500	700
Number of employees	8	22	37	48

## PLUG-IN, BACK-UP

*It's that easy with a Cipher 5210 FloppyTape™ System*



- Plugs directly into external floppy connector.
- Backs up to 25Mb single or dual 10Mb hard disks.
- 1.1Mb/minute speed - more convenient and easier than floppies.
- Simple commands - FTBACKUP, FTRESTOR, FTFORMAT.
- Selectively archive data from hard disk.
- Single 1/4" cartridge replaces up to 50 floppies.
- File orientated - only back-up what you need to.
- Eliminates data transfer problems with mirror image copying due to bad sector maps.
- No modifications needed to computer. Ideal for multiple installations.

### Host configuration

IBM-PC with internal (IBM-XT) or external Hard Disk 128k RAM min  
IBM floppy disk and controller  
PC-DOS 2.0 or 2.1 Operating System

### System Specifications

Capacity: 25MB (formatted)  
Media: DC600A 1/4-inch tape cartridge  
Recording Method: MFM bit serial, six-track serpentine  
Operating Mode: Streaming  
Backup Rate: 1.0 MB/minute (128K system) 1.1 MB/minute (256K system)

### Interface

The 5210 system consists of a Cipher Data Model 526 FloppyTape drive, a power supply and enclosure. It comes with a two-meter interconnecting cable that connects to the external floppy disk connector on the rear of the IBM PC or XT.



Dealer enquiries welcome

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data products, inc.

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**ELMEASCO**

**Instruments Pty. Ltd.**

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Tel: (08) 271 1266

### WESTERN AUSTRALIA

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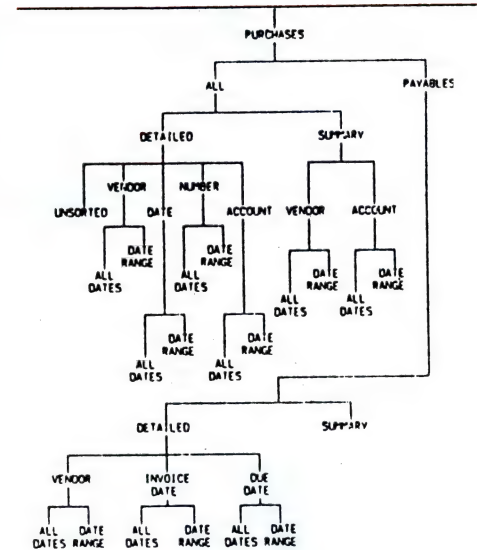
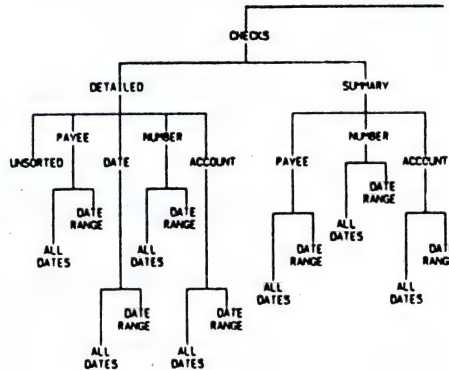
Similar reports are available for cash receipts and sales journal transactions. C.P.A.+ will also print cheques for all or any payables, if required.

C.P.A.+ comes with full help features for those who require help during input and processing of data, as well as a tutorial program which takes about 15-30 minutes to go through and which shows users how to computerise their systems, by demonstrating how to enter opening balances, input and process data, format and print reports, extract trial balances and financial accounts and perform period updates.

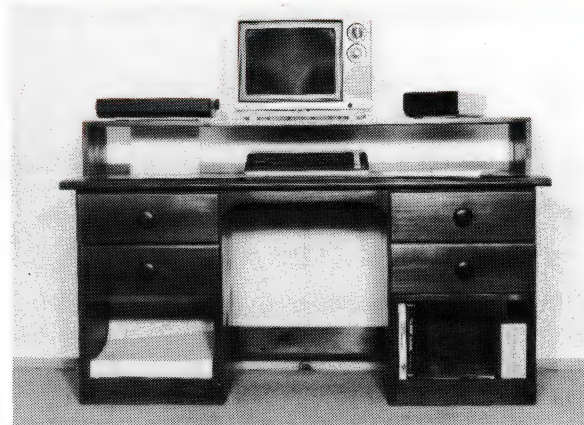
The combination of a flexible package with a wide variety of reporting capabilities that are very simple to use and full integration with Lotus 1.2.3. make C.P.A.+ a very powerful small business software package.

□□□□□□□□□□□□□□□□

Examples of reports available from the Cheque Cash Payments Journals and the Purchases Journal are:—



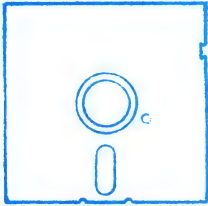
- ★ Variety of sizes available to suit most home/personal computers
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- ★ Inbuilt paper storage and feed slot
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- ★ Available in a pleasing variety of natural timber colours with a deep satin finish



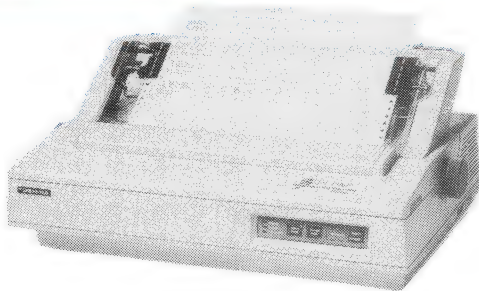
- ★ Human engineered ergonomic design to help make using your system a pleasure
- ★ Designed to complement existing furniture

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# DISCWARE



## **Toshiba P351 Printer**

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The finest 3-in-1 printer Toshiba made: 288 cps draft mode, 100 cps letter quality, 180 x 360 dots/in graphics! 24 pin dot matrix, downloadable fonts, true letter quality.

## **Toshiba P1351**

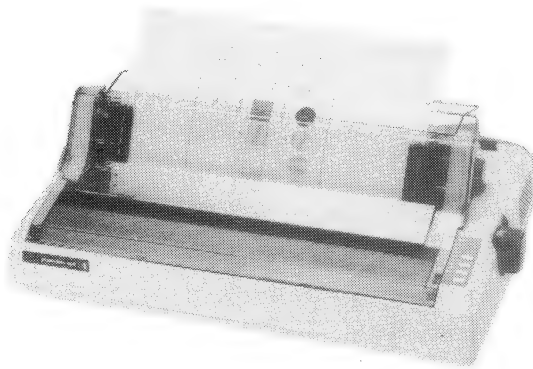
**\$1590**

3-in-1 printer at a budget price: downloadable fonts, true letter quality from the 24 pin head, superb graphics.

## **Toshiba P1340**

**\$880**

Same high-density print head as P1351, built-in tractor feed.



## **The NEC Pinwriters: now in colour!!**

### **NEC CP3/2 and CP3/3**

**\$1450**

Seven colours + black, 180 cps, superb colour graphics, modular interfaces, high density 18 pin head, 7 built-in fonts, downloadable characters.

### **NEC CP2/2 and CP2/3**

**\$1150**

80 columns, 10" wide, same specs as above.

### **NEC P3/2 and P3/3**

**\$1199**

The original 18 pin high quality dot matrix printer multi-font, modular interfaces.

### **NEC ELF Spinwriter**

**\$679**

The Spinwriter quality at a price anyone can afford, built-in both serial and parallel interface, 19 cps, 3KB buffer, proportional spacing, interchangeable thimbles.

## **BORLAND:** Software's Newest Direction

Superkey: limited number available

Sidekick unprotected 1.5

Turbo Pascal 3.0

Turbo Graphix Toolbox

Turbo Tutor

\$129

\$115

\$79

**\$call**

**\$call**

**\$99**

**\$90**

**\$70**

Turbo-87 or Turbo BCD

Turbo Toolbox

\$199

\$115

**\$169**

**\$90**

### **Desktop accessories software:**

Polywindows

Spotlight

**\$call**

**\$call**

Lotus 123 1.A \*

dBASE III

Perfect Writer 2.0

\$835

\$976

\$345

**\$549**

**\$669**

**\$299**

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See our complete software listing elsewhere in this issue.

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## Kaypro 16-2 **\$3650**

256KB RAM, 2 x 360KB RAM, RGB, colour graphics, serial and parallel ports, built-in green hi-res monitor.

## Kaypro 16 **\$5150**

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## Kaypro 2000 Lap Computer **\$3100**

IBM-compatibility in a lap computer, built-in 80x25 screen, 3.5" 720KB floppy drive, runs all IBM software expansion chassis available: accepts IBM cards, 5.25" floppy drive etc.

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A range of 4th generation microcomputers, now manufactured in Australia by Barson Computers.

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**Apricot PC:** 256KB, twin 720KB micro floppies, parallel & serial ports

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For all products not listed call  
(02) 212-6933, or 212-6552.



Continued from P. 167

## Plotting with the IBM and HP's Plotters

**A** graphics package developed for the IBM PC and Hewlett-Packard's HP 7470A and HP 7475A plotters, GRA-FIT is intended primarily for engineers and scientists. The program gives you control over the graph layout: pen selection, axis dimensions and labeling, titles, etc.

GRA-FIT is driven from a sequential command file that you create using EDLIN or another text editor. You can plot multiple curves on one graph and multiple graphs on one sheet of paper in horizontal or vertical format.

The package offers several methods for plotting. Data points can be plotted, points can be connected with straight lines or joined with a cubic spline, and data can be smoothed with piecewise polynomials prior to plotting. You can combine any number of these interpolation techniques on one graph or on one set of data.

GRA-FIT costs \$95, is not copy-protected, and requires at least 128K bytes of memory, one disk drive, MS-DOS 1.1 or later, and an HP plotter. Contact Jayar Systems, POB 2885, Station A, Sudbury, Ontario P3A 5J3, Canada.

**INQUIRY 82**

## Images and Text Over Ordinary Phone Lines

**Y**ou can capture images with a video camera and transmit them to a remote IBM PC over ordinary telephone lines with PhotoMail, an icon-driven communications kit from Chorus Data Systems. Still-frame pictures of people,

diagrams, and text can be sent at a resolution of up to 640 by 400 in 16 colors or levels of gray. Once an image is transmitted, you can save it on a disk or print it.

In addition to video images, the system can handle IBM 320 by 200 four-color graphic displays and screen displays generated by some applications programs. The communications icon supports the Hayes Smart-modem and compatibles as well as some 2400-bps units. Besides PC-to-PC communication with pictures, PhotoMail can format images to be used with electronic-mail services.

The complete PhotoMail kit is priced at \$2495, which gets you a video digitizer, graphics display card, mouse, and software; the software by itself costs \$795. PhotoMail runs on the PC, XT, AT, and compatibles. Contact Chorus Data Systems, 6 Continental Blvd., POB 370, Merrimack, NH 03054, (603) 424-2900.

**INQUIRY 83**

## Speak Your Commands

**W**ith Pronounce, you can give instructions to your computer and enter data by speaking into a microphone. This speech-input system accepts vocabulary files of 128 words or short phrases. Each word or phrase can be associated with up to 255 keystrokes, thus letting you form a macro to fit your needs or standardize nonrelated programs under natural voice control.

When you say "memorize," Pronounce starts remembering the keystrokes you type. You then give these key-

strokes a natural-language name and store them.

Speaking the name into the microphone invokes them. At any time you can exit your application program, enter Pronounce, and add, modify, or retrain vocabulary words.

Pronounce costs \$895 and consists of a circuit card, microphone, manual, and software. You'll need a PC, XT, AT, or true compatible with at least 256K bytes of memory. The vendor claims it works with most PC-DOS or MS-DOS applications. Contact MicroPhonics Technology Corp., Suite B, 234 Southwest 43rd St., Renton, WA 98057, (206) 251-9009.

**INQUIRY 84**

## Package for Turbo Pascal Programmers

**T**urboPower Software has released a set of nine utilities for Turbo Pascal programmers. The package is designed to provide utilities usually found in a main-frame environment.

TurboPower Utilities includes a structure analyzer, execution timer, execution profiler, prettyprinter, command repeater, pattern replacer, difference finder, file finder, and directory. When practical, the utilities use MS-DOS path names and standard I/O facilities, the company said.

The package supports Turbo Pascal 2.0 and 3.0 and runs on the PC, XT, AT, and compatibles. An executable version that includes a manual costs \$55; with full source code and a detailed programmer's manual, the price is \$95. Contact TurboPower Software, Suite 196, 478 West Hamilton Ave., Campbell, CA 95008, (408) 378-3672.

**INQUIRY 85**

## MIDI Sequencer/Editor

**O**ctave Plateau's Sequencer Plus is designed to turn a PC into a 64-track MIDI recording and editing facility. The software records the control information from MIDI instruments (notes on and off, keystroke velocities, pitch bends, etc.) and stores them in memory. You can then use your PC to edit them and play them back through the instruments.

Among the program's features are full editing of all tracks (including independent per-track control of the MIDI channel); capacity to add to, copy, delete, and name individual tracks; automatic record of each track's bar length; full visual editing of all notes; recording and manipulation of MIDI program changes, both within a music track or as a separate control track; and playback quantizing that ranges from quarter notes down to 64th-note triplets.

You can control the time signature of each track, from 1/2 to 3/4, and mix time signatures within a track (or create polyrhythms between tracks). You can set the playback tempo from 16 to 255 beats per minute. With a 256K-byte system, you can store approximately 12,000 notes; a 640K-byte system can handle up to 60,000 notes. The program has 10 memory buffers.

Hardware requirements include a PC or compatible. Roland Corporation's MPU-401 MIDI processing unit and interface cables, and MIDI-equipped instruments. Sequencer Plus retails for \$495. Contact Octave Plateau, 51 Main St., Yonkers, NY 10701, (914) 964-0225.

**INQUIRY 86**



## Window Controller for TRS

**T**he PRO-NT0 window-controller and applications-manager package runs on the TRS-80 Models 4/4P, II/12/16, or the Lobo MAX-80.

PRO-NT0's Window function supports four nested overlay windows that can be used directly from BASIC, C, FORTRAN, Pascal, and other languages by simple file I/O statements. Window sizes range from 1 by 1 to an 80 by 24 format screen. Other functions are character PEEK/POKE, cursor positioning, image transfer, and import/export between windows.

The application manager includes address mailing label and rotating index file, appointment scheduler, calculator, card filer and notepad, telephone list, and auto-dialer.

PRO-NT0 lists for \$49.95. Contact MISOSYS Inc., POB 239, Sterling, VA 22170, (703) 450-4181.

INQUIRY 87

## Local-Area Network for Tandy Computers

**V**iaNet software and ARCnet hardware link Tandy computers running MS-DOS into a local-area network (LAN). ViaNet is an off-the-shelf LAN software system with a distributed architecture and thus does not require a dedicated file server.

Each computer on the network receives a board but also must have 128K bytes of its RAM dedicated to the network. Transparent to the user, ViaNet is logically structured and possesses a set of 11 simple commands.

The hardware/software package for each computer costs \$499.95. Contact Tandy Corp./Radio Shack, 1800 One Tandy Center, Fort Worth, TX 76102, (817) 390-2728.

INQUIRY 88

## Modula-2 Language for Z80 CP/M

**H**ochstrasser Computing's Modula-2 System for Z80 CP/M-based computers consists of a compiler, a linker, utility programs, and a library of utility modules. The resulting Z80 code, which can be embedded in ROM, is said to be fast, small, and reentrant. Chaining and shared data between several programs are supported.

The entire system costs approximately \$150, which covers any royalty fees for programs developed by using this system. Contact Hochstrasser Computing AG, Leonhardshalde 21, CH-8001 Zürich, Switzerland; tel: 01/47 55 48.

INQUIRY 89

## Expert System and C Compiler

**X**PER and Super C systems from Abacus Software are said to offer advanced programming capabilities for the Commodore 64 and 128 computers.

XPER is an expert system that lets you build databases according to your own decision framework. Later, the system guides you through a series of searching techniques.

The Super C Language Compiler is a development system that supports the Kernighan & Ritchie C-language standard. The editor handles source-code files up to 41K bytes in length. The compiler produces 6510 machine code.

XPER costs \$80, while the Super C compiler lists for \$60. Contact Abacus Software Inc., POB 7211, Grand Rapids, MI 49510, (616) 241-5510.

INQUIRY 90

## Pocket References for UNIX and C

**F**our versions of the *UNIX Command Summary* booklet are available from Specialized Systems Consultants: the 32-page System III booklet, the 48-page BSD version, the 48-page System V reference, and the 32-page XENIX edition.

Other resources include the *VI Reference*, a comprehensive guide to Berkeley's visual editor on an 8-sided card; a 16-page *C Library Reference* that includes all library functions; a *C Reference Card* for programmers without access to

library functions; and the *Fortran 77 Reference* on a 10-sided card.

Prices range from \$2.50 for individual cards to \$4 for the booklets in 100-piece quantities. Contact Specialized Systems Consultants, POB 7, Northgate Station, Seattle, WA 98125, (206) 367-8649.

INQUIRY 91

## LISP on UNIX

**U**niLISP is fully compatible with Common LISP and is suitable for developing expert systems. Its kernel requires 32K bytes of memory on most UNIX machines, so you can use it for building interpretive filters, knowledge networks, and natural-language front ends.

UniLISP offers a segmented object list called OBLIST and optional math, statistical, and graphic add-on object lists for expert-system development. It also features standard UNIX I/O support, support for UNIX operating systems calls, physical memory access, and such editing features as vi. UniLISP has arithmetic primitives, the ability to link and unlink files or pipes, and concurrent communications.

UniLISP runs on the DEC Pro 300 series and IBM PC AT machines. Ports to other computers are in the works. Pricing was not available at press time, but a company spokesperson estimated that the end-user price will be less than \$1000 when UniLISP ships at the end of August. A demonstration disk is \$30. Contact r/l group, 7623 Leviston St., El Cerrito, CA 94530, (415) 527-1438.

INQUIRY 92

**JUST  
COMPUTERS**



# AT LAST! CUT-PRICE SOFTWARE!

Your search for realistically-priced software is over. Interface Publications has a large, and growing range of software for the Apple, IBM PC, Commodore 64. Business programs, games, programmers' utilities ... they're all here.

☐ **COMMODORE 64 ZAP-LOADER!** Speeds up disk loading by three to five times; adds disk-editing commands DIR, SCRATCH, REPLACE and VALIDATE; makes maximum use of all disk space for programs. Recommended price is \$49.95. Interface is selling it for **\$19.95 (NZ\$29.95)**

☐ **COMMODORE 64 EXTENDED BASIC SERIES 7.** All the commands Commodore should have supplied with the 64, but didn't. Thirty-two extra in all, including COPYCAT, SEQUENCE, LOADDOCTOR, CHEAT, BACKGROUND, FOREGROUND, FRAME and LOCATE. Plus pre-programmed sounds! Recommended price is \$59.95. Our price is **\$19.95 (NZ\$29.95)**

☐ **APPLE TOOLBOX** Now, for just \$39.95, you can have the most useful collection of Apple programming utilities on the market, supplied with a comprehensive, easy-to-follow manual. Manipulate your disk contents and DOS with ZEP; convert binary machine code programs into DATA and POKE statements; change DOS commands to whatever you want; DRAW takes any Lo-Res screen and writes a BASIC program to draw it precisely. And much more. This is just a sample of what is available. Recommended price is \$149.95. Our price just **\$39.95 (NZ\$59.95)**

☐ **COMMODORE 64 TOOLBOX** Similar to above. Disk only - **\$29.95 (NZ\$44.95)**

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☐ **LOGO-K APPLE** - \$39.95 (NZ\$59.95)

☐ **LOGO-K COMMODORE 64** - disk \$39.95 (NZ\$59.95); cassette \$34.95 (NZ\$52.50)

☐ **THE INTELLIGENT TYPEWRITER** Easy-to-use word processor, with many major features, for the Commodore 64. Recommended price is \$39.95.

Our price ☐ disk - **\$24.95 (NZ\$35.95)** ☐ cassette - **\$19.95 (NZ\$29.95)**

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Here's the program we are most proud of. The amazing DYNADESK SUITE program offers a combination of online desktop accessories unmatched by any other computer organiser. Four handy accessory programs, all with exclusive capabilities, make DYNADESK the single most effective business, club or home office tool you'll come across. Better yet, DYNADESK takes only 10 minutes to learn. Each program is menu-driven so you can select the activities you want at the touch of a key. Each program follows a common format. Learn one, and you've learned the lot! DYNADESK is unprotected, so you can copy it (in whole or part) as much as you want to for your own use.

THE DYNADESK SUITE includes DYNABASE, which sets up a database system which holds 2,000 entries per file (so you can get about 12,000 on a disk), any one of which can be accessed, printed from or modified in a fraction of a second. DYNANOTE is a 'note-maker' program, holding 200 notes to a file which can be accessed by date, topic or number. CALENDAR prints out (to screen or printer) a calendar for any year this century. The most flexible application, DYNAMAIL, provides a complete mailing service, directory and phone book. Store client names, stock items, club members names, addresses and phone numbers, along with an identifying code. Access by name, by identifying code (think how useful that would be, to select all of a particular type of customer, automatically) and more. DYNAMAIL will even print out contact lists, complete file dumps, or address labels for you.

With all these facilities, you can see why the recommended retail price of the DYNADESK SUITE is \$199.95. Interface is selling it, with comprehensive manual, for just **\$49.95!**

☐ **THE DYNADESK SUITE - IBM PC** - \$49.95 (NZ\$75.00)

☐ **THE DYNADESK SUITE - APPLE** - \$49.95 (NZ\$75.00)

☐ **THE DYNADESK SUITE - COMMODORE 64** (disk only) - **\$49.95 (NZ\$75.00)**

**ADVENTURE DOUBLE** Two text adventures, in the classic style, on the same disk. Try to escape from **Colditz Castle**, and if you survive that, find the secret papers and get out alive from the guarded skyscraper in **The Neilson Papers**. Recommended retail price of this double pack is \$34.95.

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☐ **MACHINE CODE ELIZA** One of the classics of Artificial Intelligence; major new implementation, IBM PC only. Recommended price is \$44.95. Interface price is **\$19.95 (NZ\$29.95)**

Tim Hartnell, prolific computer author, and one of the best-known Australians in the personal computer field, is head of Interface Publications. He says that for years he has been appalled that many software prices seem to be inordinately high, with little apparent justification.



"The amount of work involved in bringing many computer products to market - hardware, books or software - can be immense," Tim admits, "but that does not seem to justify software prices which are - in many cases - totally out of proportion with the investment in development time and expertise in the product."

Although Tim lives in Melbourne, he travels overseas to the UK and USA - where Interface has offices - two or three times a year. On the last trip, he decided to approach software developers directly, and bring back software to Australia which was not only extremely good, but which Interface could offer at realistic prices. "The more software we can sell in Australia and New Zealand, the easier it will be to convince developers overseas to place their products with us. We'll simply keep the quality up, and prices down, hopefully grow into an even more major force in the field. Realistically-priced software is here to stay. The era of the absurdly high prices is over."

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☐ **FINANCIAL GENIUS - IBM PC** - \$24.95 (NZ\$35.95)

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## NON-DESTRUCTIVE TESTING

Sonatest has been granted exclusive world marketing rights by Ultrasonics Limited to a portable computing system designed to speed up onsite reporting and plotting of ultrasonic NDT test results. Named Siteplot 400 by Sonatest, the new computing system comprises essentially a small, lightweight Husky Hunter computer having a built-in liquid crystal flat screen display, together with specialist application software developed by Ultrasonics. Copyright for the software and responsibility for its future updating has been retained by Ultrasonics.

Sonatest is a member of Schlumberger Electronics (UK) Limited, and the leading British manufacturer of ultrasonic flaw detectors and related equipment. Users of the computing system will be principally involved with NDT inspection of welds, typically in the conventional and nuclear power industries, ship-building and repair yards, petrochemical and process plant, construction of offshore rigs and production platforms, and for pipeline installations.

INQUIRY 105



## NEW DRIVE ANALYZER

Kinetic Systems Pty. Ltd., has released the MAD-1000 Winchester Media Defect Analyzer, which is capable of flaw mapping a 100 MB

drive every 15 minutes. The MAD-1000 uses Analog Analysis to find the suspected bad tracks and Digital Analysis to positively pinpoint the flaws. The dual approach lets the MAD-1000 test high capacity drives, such as 100MB drives in as little as 15 minutes, versus two hours or longer by the digital method. By concentrating the digital analysis at just a few suspected bad tracks, the digital analyzer can perform a more meticulous flaw mapping without slowing the total test time.

When used in conjunction with a DTS-1000, provision is made for MAD-1000 system testing on Multiple Winchester drives. Every MAD-1000/DTS-1000 pair can fully analyze four drives in sequence.

INQUIRY 106



## NEW DISTRIBUTOR

Hollis PLC, a subsidiary of Permagon Press, part of Mr Robert Maxwell's Group, has recently acquired around 75% of Clive Sinclair's shares in Sinclair Research Ltd in U.K. for 12 million pounds. Benefits to the existing 8000 spectrum owners is on-going support through the new distributor, Technology Corporation of Australia Pty. Ltd., who project 5,000 Sinclair QL's and Spectrums will be sold this year.

The Robert Maxwell group will solve Sinclair's temporary liquidity pro-

blem and strengthen the management of the company to maintain Sinclair dominance as the fore-leader in computer technology.

INQUIRY 107



## MAGNETIC TAPE CASE

Stamford Industries have just released a new magnetic tape case, Model MT 1/2. As the name implies, it is designed to carry one or two tapes. Vacuum formed from tough ABS, it comes with handy address label facilities built in and lined with thick foam to protect tapes at all times and a strong nylon strap with a quick release buckle. This case fills a need experienced in the trade.

INQUIRY 108



## A NO DOWN-TIME SYSTEM

Datec Queensland Pty Limited has purchased a A\$1 million computer equipment package from Olivetti for an Electronic Funds Transfer Switch (EFTS). The acquisition includes the largest Olivetti system sold in Australia to date, the CPS32 XA400 and ON/2 software.

The Managing Director of Datec Pty Limited, Mr Colin Hoschke said the purchase of the system follows Datec's recent decision to enter the electronic funds arena.

Datec Queensland Pty Limited recently announc-

ed it was establishing the first open access electronic funds transfer system in Queensland. At present, most Queensland financial transfers are handled through Sydney or Melbourne, and through switches 'tied' to specific sectors of the finance industry.

Mr Hoschke said the new equipment meant the Datec Switch would have the capacity to handle point of sale transactions, automatic teller machine operations, direct account payment and teller financial transactions.

As an open switch it could serve all sectors of the financial system, including the banks, building societies and credit unions.

Influential in Datec's decision to purchase Olivetti was that the equipment has been specially designed for intense on-line continuous operation. "Its failsafe capability includes all primary components being duplicated and the computer being able to identify and isolate defective or malfunctioning components, changing to the backup systems as required. "The major benefit is that the system guarantees virtually no down-time," Hoschke said.

The Funds Transfer Services (Queensland) Ltd, which represents the building society industry, has strongly supported the Datec initiative. The Chairman of FTS, Mr Alan Ward, said the 'open network' was the ideal approach. "It is both technically superior and more cost efficient than the 'gateway' system being proposed by the banks. We can see no benefit to the public



by having a proliferation of systems across the land duplicating a wide range of services," he said.

Mr Ike Honigstock, Managing Director of Olivetti Australia Pty Ltd said the sale of the CPS 32 was Olivetti's seventh installation of this type in Australia, and was the biggest so far. The first installation was in Newcastle, New South Wales, in September 1984.

INQUIRY 109

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### AN INTEGRATED DATA TERMINAL AND TELEPHONE

In today's competitive business environment, effective "information management" is critical to the success of all organisations. The new Displayphone, available in Australia through Amalgamated Wireless (Australia) Ltd, (AWA), for at-

tachment to AWA SL-1 PABX's, is a sophisticated business tool designed to improve response time to queries, reduce the cost of doing business and provide more effective time management.

The Displayphone is a compact desktop unit integrating voice and data communications. It provides a data terminal with a retractable keyboard, a telephone with a speaker phone, and a built-in modem that enables the user to communicate with data bases through the phone lines.

As a business telephone, it features automatic dialling, loudspeaking hands-free operation, automatic re-dialling of the last number called, a directory memory that can select and automatically dial-up a list of pre-stored numbers.

The Displayphone is also a data terminal which can be used to access both remote and local data base

services through a standard RS-232 connector. Data service telephone numbers are stored in a directory — the user simply touches a few keys to become automatically logged on to a computer.

On-screen prompts and menus make using the Displayphone easy. Multifunctional soft keys guide the operator through each step. These keys can be tailored to suit a user's specific requirements.

A telephone conversation can be carried on at the same time as information from a data service appears on the screen. This enables the operator to quickly respond to colleagues, managers or customers because of the instant access to answers while talking. The built-in speaker phone enables the user to hold conference calls, write or key in data, while continuing a conversation.

A reminder service helps the user remember important appointments and call timers make it possible to track terminal connect time and the length of telephone calls.

The Displayphone can be configured to work with the majority of computer systems and telephone networks although it was specifically developed to work in conjunction with AWA's SL-1 PABX. The unit, as supplied by AWA to its SL-1 PABX customers, enables the advanced features of the SL-1 PABX to be commanded from the Displayphone keyboard.

### BOOTS AND ALL

Former Richmond football star, Francis Bourke, purchased his Malvern Road, Malvern, newsagency early in 1985 and almost immediately began seeking to improve efficiency and productivity. He purchased the NAPS system to calculate and print paper customer accounts, handle stops and starts, maintain prices, print round cards and manage sub agents accounts.

Developers of the NAPS package, Fletcher DP Services Pty. Ltd., advise that "over 50 systems are installed from Geraldton in WA to Ayr in North Queensland and to Hobart in Tasmania with another 30 due for installation prior to June 30."

Richard Rohrt of Harp Newsagency in Kew, Victoria, has been using NAPS for over a year. Within three months of installing the system "book debt fell by about 40% and manual labour involved in calculating monthly accounts fell from 70 hours to five minutes." A complete Hardware and Software package costs around A\$7,500.

INQUIRY 110

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### SOFTWARE PACKAGE FOR ADVANCED MANAGEMENT

Canon Australia has developed a fully integrated software package that is a sophisticated aid to advanced and quick decision-making.

The totally new software programme, "Super Canobrain", works with the





company's new personal computer, the AS-300, providing interactive solutions to both routine and complex management tasks in brilliant colour reproduction.

Five important business functions are brought together in Super Canobrain which utilises the most advanced multi-windowing techniques:

- datafiling — for counting very long tables;
- table and spreadsheet preparation;
- graph generation — for drawing in colour a wide range of graphs and charts;
- picture drawing — of virtually any type of figure, including cut

and paste; and, advanced word processing — for preparation, editing and printing documents.

Super Canobrain has been developed specifically for full colour printed reproduction enabling superb presentation of reports and documents. Another outstanding feature is the ease with which data prepared with one function can be used with another. Each of the functions can be mixed and matched in numerous combinations sharing the same data and enabling the easy creation of reports and documents that incorporate all the relevant chart and illustrations for internal presentation or for impress-



ing clients and customers.

Canon's Super Canobrain is easy to learn even for the "uninitiated" executive, who is not a computer convert. Each function is clearly displayed

down the right-hand side of the AS-300 screen by way of symbols. From the operator's point of view, all that is required is pointing to these symbols using a hand-held mouse and click-

## COMPUTER MEDIA TRANSCRIPTION/COPYING

- ★ Software, duplication, copying and formatting for virtually all popular computers including the IBM-PC.
- ★ Downloading 8" CP/M formats to over 90 5 1/4" CP/M formats.
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## SOFTWARE AUTHORS/DEVELOPERS & DEALERS

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Including: ★ 8086 processor at 6MHz.

★ 256 to 768K expandable RAM.

## SPECIAL IBM PC (AND COMPATIBLES) UTILITIES

- ★ Operating system converters.
- ★ CP/M 80 to MS-DOS/PC-DOS - runs CP/M 2.2 software under MSDOS.
- ★ CP/M 86 to MS-DOS/PC-DOS - runs CP/M 86 software under MSDOS.
- ★ MS-DOS PC-DOS to CP/M 86 - as above in reverse.
- ★ DATA/TEXT FILE CONVERSION.
- ★ TRANSCRIPTION UTILITY: Copy, Format, Read/Write dozens of different formats in your PC.
- ★ Hardware/software for IBM PC to read/write APPLE-DOS, APPLE CP/M format.

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ing the button. For example, the copy symbol means copying information created under the five functions; the print symbol means creating printed or hard copies of paste-ups on the screen; and the waste bin symbol means discarding information created by each, or a combination of the five functions.

The multi-window function enables the operator to see clearly several different functions on the same computer screen. A spreadsheet, for example, can be referred to while a graph is being drawn.

Canon's new AS-300 personal computer is an example of state-of-the-art Japanese microcomputer technology. With its 80186 CPU, it provides high-speed data processing and management of a large amount of memory necessary for undertaking sophisticated business tasks.

INQUIRY 111

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## HIGH SPEED DISK DRIVE

The John Sands Sega SF7000 Super Control Station recently went on sale. Initially released towards the end of 1984, it provided an international standard 3 inch (76.2mm), high speed, disk drive unit for the home and business computer market.

As well as being a disk drive, it also provides the user with an extended level of BASIC programming, total 80K Random Access Memory (RAM), and both standard Centronics and RS232C interfaces.

High speed efficiency is the principal advantage of the SF7000 disk system. The disk drive operates at a speed 40 times faster than most tape systems. By way of comparison with other disk systems, the SF7000 provides the user with an even higher speed than the old 5.25 inch floppy disks. Operation is at a baud transfer rate of 250K bits per second.

With the SF7000, the computer has a total of 80K of RAM. Due to the large repertoire of commands in Sega BASIC, 45K of this memory is used by the disk operating system and BASIC interpreter. Another 16K of RAM is used for the high-resolution graphics, and the remaining 19K of RAM is available for BASIC programs.

The disk operating system (DOS), and the SF7000's enhanced BASIC language, allow the user to store programs and files, which can be either sequential, i.e., one after the other, or random access.

This high speed computing system deals with such materials as files of names and addresses; details of collections like wine cellars or stamp collections; spreadsheets — columns of figures or data under separate headings across the page used for personal, business and home finance analysis; and tasks like letter writing, writing reports and essay writing — now generally becoming known as word processing.

The Sega Compact Floppy Disk can hold 156K bytes of user formatted storage on each side. This means that when properly

prepared for storage, both sides of the disk together could store the equivalent of 200 quarto pages of double spaced type. For the programming enthusiast, this is the storage equivalent of close to 20 programs each of 16K bytes.

One last feature of the SF7000 design worthy of note is the incorporation of two connections, or 'interfaces', in the one unit. This provides the user the complete flexibility in deciding what optional extras to connect to the computer.

For example, the in-built Centronics interface allows the user to select any of a number of different kinds of printer, normally referred to as 'parallel' printers; the RS232C gives the enthusiast additional scope to include computer accessories like modems and acoustic couplers.

INQUIRY 112

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## MINICOMPUTER RIVAL

One of the first, if not the first, 32-bit supermicrocomputers to be based on the VME bus was introduced at the 1984 National Computer Conference by Charles River Data Systems. A fast and powerful machine, the universe 2203 and its unbundled central processor, the VCP2000, are designed for OEMS and end users to run programs developed under Unix or Unix-compatible operating systems. Both computers use the 12.5MHz Motorola 68000 microprocessor.

For Charles River, which in 1981 introduced its

Universe 68 32-bit supermicro built around the Versa-bus, the choice of the VME bus was obvious. The company believes that this bus — and not the other high-speed buses being touted such as Multibus II, NuBus, and Futurebus — will emerge as the most widely used bus in the 1980's, according to Bill Whitbourn, Technical Director of Inteltec Data Systems, Distributors for CRDS products in Australia. "We expect the VME bus with its Eurocard format to be the dominant 32-bit bus and see major manufacturers moving to the VME bus. There's little action with other buses."

Aimed at tough industrial environments, the bus structure incorporates highly reliable gas-tight connections between printed-circuit boards and cables, and rigid board reinforcement. The Boards themselves are compact 233.35 x 160mm, double-height Eurocards.

Though it sells in the A\$15,000 to A\$20,000 range, the 2203's performance rivals that of low-end superminicomputers costing upwards of A\$100,000, including Data General's MV/4000 and Digital Equipment Corp.'s VAX 11/725. Performance comes from the high-speed 68000 and a 4-Kbyte cache memory that allows the processor to execute programs without time-consuming wait states. Cache access time is 45ns, and the cache hit rate is 80%.

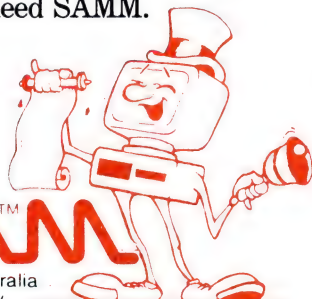
Overall, the 2203 performs at 1.25 million instructions per second and has up to 16 Mbytes of



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main memory and a CPU cycle of time of 80ns. Included in the machine, which is packaged in a 5½ inch-high enclosure, are memory allocation and protection and a 35-Mbyte Winchester disk. For backup, users may select between a floppy disk or ¼ inch streaming tape.

INQUIRY 113

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## PERSONAL BUSINESS SOFTWARE

With the arrival of the Sega SF7000 Super Control Station, there has been a steady increase in the range of personal business software available to SC3000 owners. The Sega list comprises some 10 titles, the most important analytical programs being the HuCal spreadsheet program and Sega Base — a database program.

HuCal is an extremely powerful disk based spreadsheet program that includes a 176 page instruction manual in the package. A spreadsheet is an analytical type of program that is especially useful in working out budget plans and financial forecasts.

HuCal is the ideal package for all those who need to juggle figures — including the proprietors of small businesses, those responsible for household and domestic expenses, and students of all ages involved in financial modelling, accounting, etc. This particular Sega program includes special in-built instructions, called macros, which make it a much easier program to manage for home studies, hobbies and business.

For the technically minded, HuCal provides up to 255 columns across, with 10,000 rows deep, it has a SEARCH function, a SORT function, plus a window function in which you can view parts of your spreadsheet at will. The program provides full on-screen editing, and you are able to print out on paper the results of your analysis.

Sega Base is another disk based program produced for the Sega SF7000 which gives you efficient control of your own information files. With such a computer file, you have the facility to take hold of a large parcel of information, and organise it in the way you want. You may choose to locate specific pieces of information, e.g., all names beginning with "S"; you may wish to create a file of information on a particular topic like 'energy'; or build up various 'bundles' of information for school projects.

INQUIRY 114

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## CHARTERED ACCOUNTANTS TO SUPPORT SOFTWARE

Interactive Applications, a member of PAXUS Commercial Systems, has signed an agreement with chartered accountants, Deloitte, Haskins and Sells in which Deloitte's are appointed an authorised support organisation for Interactive Applications' CHARTER SERIES range of accounting packages. The agreement means Deloitte, Haskins and Sells will offer dealer liaison, consulting, installation, training and support of the Charter

Series packages in most Australian capital cities, plus Newcastle.

David Durlacher, Marketing Manager of Interactive Applications, said the agreement was concluded because of Deloitte, Haskins and Sells' knowledge of, and experience in, microcomputer accounting software, and consultancy, training and support skills.

Deloitte's has a specialist group of 50 people throughout Australia with a blend of business, accounting and microcomputer experience. "The support agreement will complement the product and also the level of service available to the business community," said Vincent Sweeney.

The Charter Series packages which Deloitte, Haskins and Sells install and support include General Ledger, Debtors/Sales Analysis, Order Processing, Inventory Control/Purchasing, Creditors, Ledger, Free Format Invoicing, Payroll, Job Costing, Bill of Materials and The Liberator package.

INQUIRY 115

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## AUSTRALIAN MANUFACTURER WINS AWARD

The Labtam series 3000 Microcomputer System has won an Australian Design Award.

The Industrial Design Council of Australia has announced that the Labtam Floor Model, an 8/16 bit multi-tasking, multi-user system and the Labtam Desk Top 8/16 bit multi-tasking, multi-user system have both been selected for

the award. This award will further assist Labtam to compete effectively with overseas manufacturers operating in the same markets.

John Sciffer — Labtam's National Sales Manager said winning these awards would be an extra boost for Labtam as they are experiencing record domestic sales at the present time.

INQUIRY 116

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## D.S.E. ENTERS BUSINESS COMPUTER MARKET

Dick Smith Electronics looks serious about its attack on the business computer market with the Olivetti M24 business computer.

With the introduction of the M24, and its portable companion, the M21, into its range just over three months ago, Dick Smith Electronics highlighted its commitment to this extremely competitive market. In the biggest single deal in the company's history with Data Terminal Systems, D.S.E. has gained a contract valued at over \$500,000 from Data Terminal Systems.

The M24s purchased by DTS are to be used in point-of-sale solutions over the next 12 months. D.S.E. is to provide service and backup facilities.

The M24 currently represents the top of D.S.E.'s computer range. For business, it's a highly sophisticated, extremely fast and reliable machine, with a powerful base unit suited to most business tasks and a wide range of peripherals and options.

INQUIRY 118

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## ALPHA-NUMERIC TERMINALS

While leading the field in the supply of high resolution graphics terminals integrated into its range of high performance multi-user and networked microcomputers, Labtam International has recognised that not all its users have a requirement for such graphics capabilities and has introduced its own range of otherwise fully compatible alpha-numeric terminals to fill that void.

Its new 3000 AH terminals are half price, but look and feel exactly the same as the standard Labtam 800 by 600 pixel resolution monochrome graphics terminals and integrated desk

top computers.

The 3000 AH provides a subset of the ANSI standard terminal commands, as well as VT-100 compatibility, thus being fully suited to a wide range of non-graphical applications.

Labtam's experience with installed multi-user and networked systems has indicated that a substantial portion of the terminals at most sites are only used for non-graphical applications and thus many users will be able to reduce their costs with judicious use of alpha-numeric terminals.

Labtam International has a range of locally designed and manufactured computers on the market, supplying both high performance 16-bit systems,

which run the full range of industry standard operating systems, and state-of-the-art 32-bit systems running Unix 5.2. Labtam has also achieved success in several very competitive international markets.

INQUIRY 120

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## TROUBLESHOOTING THE IBM PC

Elmeasco Instruments has released a software package for troubleshooting the IBM PC using the Fluke 9010A or 9005A Micro-System Troubleshooter. These program cassettes, which have been engineered and produced by Diversified Data Corp., utilize many of the 9010A/9005A's

features, particularly the automatic tests and programmed routines. By using well designed troubleshooting program tapes, test personnel with a variety of skill levels will be able to successfully troubleshoot microprocessor-based IBM PCs.

Troubleshooting the IBM PC can be greatly simplified by using the 9010A/9005A. Complete fault location with a fully programmed 9010A/9005A requires only that the PC contain a functional power supply system clock and microprocessor socket. Testing can begin immediately upon powering up the PC, and the technician can choose to test any portion of the system he

## AARDVARKS' other utilities include:

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wishes. In programming a set of test tapes for the PC, Diversified Data Corp. set out to realize several goals:

- The test set should provide cost effective support by putting affordable hardware and software into the hands of technicians.
- The automatic tests should transcend the capabilities of available disk-based diagnostics and support troubleshooting to the component level.
- The accompanying user documentation must prove to be an asset rather than a hindrance, serving to minimise time spent on activities other than troubleshooting.

The challenges that confronted this effort began with the PC itself. A repair shop sees many different PC configurations which included IBM or third party expansion boards and several different memory sizes. The test set would have to support these various configurations. In addition, many of the signals being tested are asynchronous, independent of bus timing. This is particularly true on display adapters and certain other expansion boards. This would necessitate use of guided probe tests in unsynchronized modes. The PC also has very few socketed chips (fortunately, the processor is socketed) which not only frustrates most attempts at trial-and-error or "shotgun" troubleshooting, but makes fault insertion more difficult during software testing. Finally, the magnitude of

the anticipated effort due just to the number of nodes and chips in the system placed great performance on the software documentation and user's manual development.

The final product is a modular set of tapes and documentation which has been tested and proven to allow relatively unskilled technicians to troubleshoot the PC to the component level in a short time, frequently in less than 15 minutes. The tapes have been shown to meet Fluke's software configuration, autotests, GFI, and documentation goals.

The basic test consists of four minicassettes. The first tape is dedicated to autotests and functional tests and the remaining three contain GFI routines for the system board, monochrome adapter, and disk controller, respectively. Additions to this basic library will be made available in the future using a separate tape for each adapter or expansion board.

INQUIRY 141

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## UPGRADE

AWA-Thorn launched its second home computer model, nine months after it first entered the home computer market with the Amstrad CPC 464.

Amstrad's new model is the CPC 664, essentially a CPC 464 with a built-in 3" disc system and a number of enhancements to BASIC and the operating system to make the most of the integrated disc system.

The CPC 664 will come with a choice of monitors

and will retail from around A\$800 with the green screen, and from around A\$1,000 with the colour monitor.

Virtually all existing CPC 464 software will run on the new 664 — plus a large proportion of the existing CPM80 software base of over 5,000 programs. The new CPC 664 incorporates a built-in cassette interface so that existing tape based software can be loaded — although most users will obviously prefer to use the disc alternatives where available.

AWA-Thorn believes that the Amstrad CPC 664 offers a package for the serious user upgrading from earlier machines. The first time buyer now has an obvious choice of hardware that comes packed with the applications potential of CP/M and an existing base of over 200 other items of software from the wealth of high quality entertainment material available. A second disc drive is available for the 664.

The launch of the Amstrad CPC 664 can be seen as a consolidation of the success of the 464, which reached 200,000 sales in the U.K. alone by Christmas last. Amstrad plans to sell 600,000 computers in the U.K. and abroad during the next year.

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## MANAGEMENT APPOINTMENT

Software Corporation of Australia recently announced the appointment of Dr. Robert P. Wells to the posi-

tion of Marketing Manager. Dr. Wells will have special responsibility for establishing SCA Publishing, a division of Software Corporation of Australia devoted to publishing Australian-made Apple, IBM, and MSX software for the Australian and international markets.

A native of Los Angeles, California, Dr. Wells was until recently Vice President and Publications Director of Continental Software, one of America's largest independent software publishing houses. He concurrently held the position of Editor-in-Chief of The Book Company, an affiliated microcomputer book publishing organisation. Dr. Wells is an author/editor of *The Book of Apple Software*, *The Book of IBM Software*, and other best selling computer book titles.

In announcing the appointment, Arnold Roth, SCA Marketing Director, said: "We're extremely pleased to bring a person of Dr. Wells' talents and experience to SCA. Software publishing in Australia is a promising but difficult proposition, and Dr. Wells has the special skills and experience in software publishing that we require."

Before joining Continental Software, Dr. Wells earned his Ph.D. in English Literature at the University of Edinburgh in Scotland. "He is a self-motivated individual with a record of achievement," said Roth. "Having helped to start and build Continental Software, he has the knowledge to make SCA Publishing a success. He has a solid background in technical



writing and trade publishing; he has first-hand experience in the international microcomputer market. From our point of view, he is an ideal appointment."

Wells faces several challenges in taking the new position. "In addition to the ordinary difficulties associated with establishing a viable publishing operation," says Wells, "there are two conflicting self-images prevailing among local software developers which we need to balance in order to create a better climate for growth. The first is that of self-doubt: few here believe that Australia can produce software that can compete successfully on an international level. This is just not the case. The second, conflicting, attitude is one of unrealistic expectations among software authors. Many expect high and almost instantaneous rewards, and grossly underestimate the marketing effort involved in making a product a success."

"Both of these attitudes can be changed, fortunately," said Wells. "But they increase the challenge, adding an extra hurdle not faced today by software publishers in America."

SCA Publishing intends to develop Australian-made software for several popular machines, initially tailored for the local market. Based on success here, products will be developed for export. SCA's first project will be the release of the new *Data Express*<sup>TM</sup> "intelligent" modem for the IBM PC, a product approved by Telecom Australia. Data Ex-

press is an internal modem on a card compatible with the Hayes Smartmodem<sup>TM</sup>, which currently dominates the American scene. It is the only modem which fits into any slot on the IBM PC and is completely firmware driven.

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### NEW CATALOGUE

Dick Smith Electronics has announced the release of its Catalogue for 1985/86. Bigger than ever, this year's catalogue contains over 3500 products, of which 500 are new.

For business and home, there is a full range of computers and software, including hundreds of items for around the home, games, alarm systems, audio, hi-fi and hundreds of books and kits.

It is obtainable from any Dick Smith Electronics retail outlet for only \$1.00 (if you buy a copy you'll find a \$1.00 bonus discount coupon inside).

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### FOURTH GENERATION LANGUAGE

There is no doubt that our current system of education is producing in our colleges and universities a race of computer experts at a very early age — irrespective of their ultimate careers and choice of profession. Yet those over the age of 30 may have had no formal contact with the computer until, say, recently. It is this age group

whose executives make the decisions which influence the purchase of computers. Fourth generation language will bring the computer to the decision maker's own fingertips — at last. This may have a profound effect on computer sales and their applications within business.

David Dougherty, director of technical services and customer support of North Sydney-based IMS International Computers, believes that common use of 4GL will be a major milestone for those selling computers.

"The fourth generation language will do a far greater job in the marketplace for those of us selling computers than we fully appreciate now."

He believes the role of the programmer continues to provide a psychological barrier between the machine and the user. The machine retains its mystery for a particular age group whose lack of knowledge is a disincentive to progress. But the fourth generation language will significantly reduce the mystery which exists in the minds of the non-specialists.

David Dougherty believes that current programming languages still provide a natural barrier between the end user and the machine. He is convinced that the fourth generation will break through this barrier in a way which no current language has managed to do.

"The user-friendly term pre-dates the arrival of fourth generation language because those in the PC market needed to coin a

phrase which would meet a marketing need. This is not to say that the term does not have validity. Of course, it has. But this is a neat description of the way manufacturers would like to feel their products are perceived by potential customers. The problem is that those within the smaller business community who have invested in the PC, know how easy it is to produce a program to do a specific task. The flaw has been the inability of the PC to extend its capability. Many investors in the PC saw it as the end of the line — the ultimate solution, only to realise, too late, its limitations.

He believes the advent of the common use of 4GL will highlight the fact that the software rules will change.

"Currently, there are two approaches: you have the choice of buying software off the shelf, or using your own programmer or software house. The system has become part of the norm, but the arrival of 4GL may well drastically change this."

Results of government interfirm comparisons show that the state-of-the-art at any one point dictates the thinking of management. Industry and trade associations have been particularly active in finding common denominator software for their respective computer systems within their industry systems; they have been anxious to co-operate to find management accounting parameters which would be largely suitable for use within any one industry. Software houses have also



been quick to offer packages to industries and businesses where they have seen a gap in the market.

David Dougherty states: "Both the Macintosh and the Apple have made tremendous headway in persuading people that there is nothing to be frightened of in operating a computer. But the 4GL is the ultimate solution for sophisticated microcomputers."

Productivity and efficiency are bound to increase enormously since the executive will not confine his program to the immediate job in hand. There will be an element of creativity, where the arrival at a solution to one problem will automatically suggest to the executive an improved method of doing something else.

This may be the province of current programmers, but it is likely that once the intermediary is removed from the cycle, more applications will be generated as a matter of course. Productivity will increase enormously. "This will be excellent for those of us who are selling high performance computers," states Dougherty.

He believes the arrival of hands-on experience by executives of computer companies will be a major breakthrough in expanding current installations and creating new ones. "More programs will mean more applications and, therefore, expanding systems. This will mean better business all round. I believe programmers will have a wide role to play in the future, but they will need to concentrate on making 4GL easier to use and sophisticated in

scope."

Currently, users have to look at what software there is on the shelf and tailor their "problem" to suit the software. It is a fact that no two companies in the same business would solve their administrative or organisational problems in the same way, although there would be many similarities.

It is understandable that users need to feel that their own configuration is capable of expanding to cope with whatever the future may hold — optimistically, this means getting larger, not smaller.

The capacity of the computer must embrace the requirement to place computing at the fingertips of growing numbers of people within an organisation, to maintain the speed at which the system works for everyone, and to bring mastery of the system within easy reach of the majority, rather than an elite which understands a special language.

It is not surprising that the Japanese are investing vast sums of money into both fourth and fifth generation languages.

David Dougherty believes that when 4GL takes off, computing will find a rapidly widening market with small to medium size businesses.

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## TWO NEW ELECTRONIC PRINTERS

Brother has launched two new electronic printers to complement its range of models for the fastest-moving office — the new

HR-15XL daisy wheel printer and the new 2024L fast dot matrix printer.

The HR series of daisy wheel printers is designed to keep pace with high volume, while producing clean, clear pages of letter quality type. The HR-15XL incorporates a 3K buffer for smoother printing and can print bidirectionally at a fast rate, ensuring output keeps up with demand.

A text reprint function means whatever is stored in the buffer may be printed continuously. It produces as many originals as necessary, with a minimum of supervision. And the HR-15XL's shadow printing function and red colour printout make the highlights "jump off the page".

It comes equipped with either Centronics parallel or RS-232L serial interface and is compatible with any small computer. Optional features include the attachable cut sheet feeder and the Brother KB-50 keyboard unit. Other features, such as sub and superscript, auto underlining, proportional spacing and carriage skip movement, should be appreciated in the marketplace. It is priced at around A\$800, including sales tax.

For occasions when high speed output is the priority, Brother has launched the new 2024L dot matrix printer. At around A\$1800, including sales tax, it is the most expensive printer in Brother's dot matrix range, offering extremely high speeds, and reproduction with exceptional clarity. It has a printing speed of 160 characters per second in draft mode, 96 characters per second in letter quality

elite, and 80 characters per second in letter quality pica.

A high technology printer head ensures a lower power consumption, while an ink roll cassette ribbon increases ribbon life. Optional auto cut sheet feeders also allow the 2024L to handle A4 and B4 paper sizes.

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## MULTI-STORE COMMUNICATIONS SOFTWARE

Breeze Software (Aust) Pty. Ltd. of Geelong (Vic.), developers of the highly-acclaimed multi-terminal point of sale system for the retail industry, have now taken the system a step further with the introduction of a multi-store communications package.

The Breeze Communication Software for multi-store or franchise operations links each retail outlet directly to the Head Office computer for centralised accounting and management control.

The link is achieved by connecting each in-store computer to Head Office through the telephone network. Information is transmitted from the stores to Head Office, and from Head Office to any or all stores, by 'phone.

An auto dial/auto answer modem at each location enables the central computer to call every outlet in turn, automatically, to extract predetermined information requirements, and to send messages or updated common information. The auto dial facility can be set to



operate at night, to avoid conflict with in-store operations. For widely scattered retail outlets, this also offers the advantage of lower, off-peak STD call rates.

A boot diskette in the central computer is programmed to suit each user's needs, controls the start-up at a pre-set time, without the need for operator attention. The diskette will automatically restart communications in the event of a power failure and subsequent reconnection. Failure to connect with any stores (e.g. if the telephone is out of order) is automatically reported on the printer for operator attention next morning.

Coupled with the Breeze

point of sale software, the inter-computer communications program provides a fully comprehensive, centrally controlled accounting and management reporting system — a system which has the flexibility to convey as much or as little information as required between the stores and Head Office.

For example:

- Detailed product sales can be sent from each store to the central computer, to produce reports comparing and totalling sales by quantity, value and profit margins, by supplier, by product group, etc.
- Sales and collections summaries from each site allow centralised

control, or calculation of franchise fees, or monitoring of cash flow.

- Product file changes indicated from Head Office can ensure that descriptions, prices, suppliers, sales tax percentages, etc. are uniform for all stores.
- Account customer trial balance and statements can be produced centrally at Head Office.
- Stock control and/or re-ordering can be centralised.

Because the Breeze Communication Software can be operated on a microcomputer, it doesn't require an exorbitant capital investment to take advantage of its tremen-

dous labour, time and paper-saving capabilities.

For multi-store or franchise operators, automated management reporting and accounting is now just a 'phone call away.

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## COMMUNICATIONS MATRIX SWITCH

Summit Communications Pty. Ltd. will play an important role in centralising the processing and network operations of the Commonwealth Bank of Australia, following a multi-million dollar contract signed in Sydney recently. The order, involv-

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Public domain software consists of programs which individuals and clubs have written and placed in the public domain for the benefit of all. There are literally thousands of such programs available. Unfortunately, until now there has been no formal support for this software. If there are bugs then it is the responsibility of the user to fix them. This lack of support has prevented many people from seriously considering the use of public domain software in their business. **Public Domain Software** magazine (PDS for short) overcomes all that. Our editors and programmers select the best of the public domain programs available, convert them for Australian conditions, add features, carefully test and debug them and prepare documentation which is published in the magazine accompanying each disk. Nor do we stop there: bugs reported from the field are fixed and new features added in response to requests. Just the level of local support you would expect to get (but often don't!) for programs costing hundreds of dollars each. Yet a **12 month subscription to Public Domain Software costs only \$120.00.**

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NEC APC 8" MSDOS ☐ INQUIRY 147



ing the unique Summit Universal Network Switch (SUNS), will be completed in August of this year, and will provide the Commonwealth Bank with switching capabilities not previously achievable.

The first customer for SUNS is one of the world's largest banking networks and, being located in Australia, is a fitting site for the first installation of the Australian designed and manufactured equipment.

Data communications is playing an increasingly important role in the computer industry, as networks around the world expand in size and complexity. The necessary ingredients in any component of a large network are speed and reliability, and it is in these areas that Sydney-based Summit believes it has achieved a technological breakthrough, unequalled anywhere in the world.

According to the Project Manager for the Commonwealth Bank, Mr Steve Myers, the bank has purchased SUNS, because the centralisation of its operations in Sydney will necessitate very sophisticated switching equipment.

"We will have a large number of resources in Sydney, both in terms of computer equipment and highly skilled people, and there must be a reliable communications switch to bring standby equipment on line," he said. "SUNS will take over from our present simple switching mechanism, where for every piece of operating equipment we need a standby. In future, we will use many front end processors and

need only a few for standby purposes."

"The reliability of the switching equipment is critical as all communications from the bank's national network will be passed through it," Mr Myers said.

Dr Paul Jackson, Summit's Managing Director, states that the main function of SUNS is to monitor local and remote lines, and in the event of a malfunctioning piece of equipment, to alleviate the problem by switching its communication load to other resources.

"The innovative features of SUNS, however, are what make it particularly valuable," Wally Kalnins, Summit's Project Engineer, said.

"Individual lines have no inherent speed limit and are only restricted by the speed of the data line. Unlike other switches, even if the total number of lines is being used simultaneously, maximum speed of communication is maintained," he said.

"SUNS also incorporates standards translation ability which allows interfacing of an extraordinary variety of different equipment. This feature has enabled the Commonwealth Bank to purchase the latest X21 standard equipment which will connect to the existing Telecom V24 equipment.

"SUNS was designed for uncompromising reliability, utilising duplicated parts to provide internal backup. Another economic feature of SUNS is the X22 multiplexer which concentrates a number of data paths onto one high speed Telecom line. These streams are then

unmultiplexed, or unscrambled, at the destination and dealt with individually. They are then reconcentrated for return sending. The process offers a huge economic advantage over using separate DDS lines.

"The development of SUNS represents a big step forward for Australian technology as the unique features of the equipment have already attracted international interest, especially from the United States."

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## BAUD RATE CONVERTER FOR MULTIMODEM

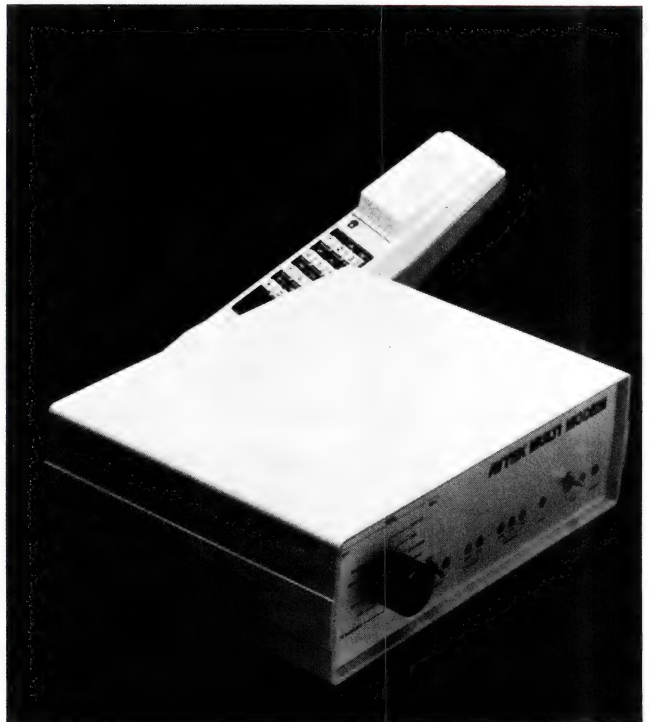
Avtek now has a powerful and useful "split baud rate" option for their MultiModem. The converter allows computers to

communicate at the new higher baud rates (600 and 1200 baud). This requires a low speed "back channel", usually at 75 baud. Many popular computers — such as Tandy TRS80 and Commodore — cannot support 1200/75 baud rates as they stand. This option handles the problem at the Modem end.

Phil Gleeson of Avtek sees his baud rate converter as essential with the introduction of Videotex, which is going to be using the 1200/75 baud split rate. "People in country areas, especially, are looking for fast 'phone communications and 1200 baud is essential if this is to become a reality. Our converter makes this possible with the low cost microcomputers on the market now,"

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Baud Rate Convertor



## EDUCATIONAL CAD SYSTEM

GTCO digitisers are to be used in Australia's largest educational CAD system to be installed in Tasmania by a Melbourne firm, Sleebs Computer Industries, which is to supply digitisers as part of a A\$400,000 contract from the TAFE Division of the Tasmanian Department of Education.

The CAD system, running AutoCAD software, is to be used within the Education Department to teach the principles of Computerised Aided Design and Drafting.

The largest educational CAD tender to date in Australia, the Tasmanian installations will comprise over four separate sites, 24 NEC APC-III microcomputers, four large and 20 small plotters, as well as 24 GTCO digitising tablets. Sleebs, which has opened a Tasmanian office to support its Tasmanian installations, already has 100 microcomputer and five minicomputer systems installed in Tasmania. Of these, 85 are within the Department of Education. The new order will bring the total to 124.

The GTCO digitisers were chosen because they offer a number of advantages over the mouse. Commenting on the incorporation of the GTCO units in the installation, a spokesman for Sleebs Computer Industries, Murray Stein, said a major factor in Sleeb's decision to use GTCO's was their "excellent compatibility with AutoCAD." Stein said GTCO had an unsurpassed reputation for quality and

dependability and the digitisers performed better with AutoCAD than any comparable equipment. The functionality of the GTCO on AutoCAD enables the user to define a portion of the tablet to be used as a menu area for commands and templates, Stein said, which was an advantage it had over the mouse.

A portion of the tablet can also be reserved for pointing at the screen — another advantage over the mouse, since the template can be placed on a tablet. Existing drawings can also be input with a tablet, thus making them more versatile than a mouse. "GTCO's larger tablets and plotters work especially well with AutoCAD. We have never had to send a GTCO unit back for servicing," Stein said. "They are reliable and solidly made and particularly well suited to specialised applications," he added.

Stein attributes AutoCAD's success not only to its ease of use and speed, matching the speed and computational facilities of the new generations of micros, but also its capability to support a wide variety of peripheral devices, unlike other CAD programs. These devices included not only digitisers, but plotters and digitising cameras all marketed by Sleebs as an OEM for the TCG Group.

Stein said AutoCAD supported such peripherals as AlphaMetrics plotters, GTCO digitisers and the Datacopy camera—all supplied locally by the TCG Group.

The Datacopy camera had recently been coupled

with AutoCAD to electronically digitise drawings onto camera. Connected to a micro running AutoCAD, the Datacopy camera can automatically digitise existing information onto computer. AutoCAD, the largest and most comprehensive CAD design program currently available, according to Stein, is a two dimensional program designed specifically to run a microcomputer. A three dimensional version of AutoCAD is for early release.

Originally released three years ago on 8-bit computers, and since upgraded to 16-bit machines, AutoCAD software now has 60 to 80 per cent of the capability of a mainframe

computer.

Many companies are now using AutoCAD to perform all their preliminary drafting, then loading it into a mainframe when the sophistication and increased computational facilities of the larger units are required. At a cost of around A\$15,000, compared to A\$100,000 for a mainframe, smaller firms can now afford CAD facilities.

One of around half a dozen CAD programs on the market, AutoCAD is by far the most popular and biggest selling with around 14,000 sites worldwide, Stein claims.

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## ACCOUNTING SOFTWARE

One of Albury's leading public accountancy firms has found it is saving a substantial amount of money with its new Interactive Applications accounting software.

Krain, Schnelle and Co. is a well-established firm in Albury and since acquiring the CHARTER SERIES General Ledger, Mr Roger Schnelle says that their clients can be more effectively serviced.

Because the General Ledger package allows the user complete control over the layout of reports, Krain, Schnelle and Co. have found that they have no need for an additional member of staff to process documents, once reports have been prepared.

"We think it is excellent," says Mr Schnelle. "The Report Writer is more or less like a word processor, as it allows you to specify where you want to put things on the page. You can do your reports all in one go and they are beautifully presented — there for ever and a day.

Krain, Schnelle and Co. has a wide ranging client base which includes primary producers, building trade contractors and sub contractors, small and medium sized retail traders, manufacturers, motels and registered clubs. With this variety and with annual turnovers of their clients ranging from below A\$20,000 to over A\$1 million, flexibility is a major priority.

Mr Schnelle believes the company has found the solution in Interactive Applications' CHARTER

SERIES. "This General Ledger package can be adapted to any client, however small," says Mr Schnelle. In the past, when the firm used bureau systems, it tended not to use computers for small clients. Now the computer is used even for the smallest account.

"We have found that this package has allowed the development of 'tailor-made' charts of accounts and report formats for different groups of clients," commented Mr Schnelle.

Another advantage that Krain, Schnelle and Co have found is that it is simple to use. Mr Schnelle trained himself, and then his staff, to use the system — and with excellent results, he says.

"We looked at a variety of systems over a period of three years or so," Mr Schnelle says. "After searching more intensively for over 12 months and not satisfied with the inflexibility of many standard General Ledger presentations, we decided on this installation."

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## HARDWARE SALES

Two interesting figures recently advised by Amust Computer Corporation Pty. Ltd., are that NEC sold some 1,162 APC-III's in May. That constitutes approximately 17.5% of the market, and compares very favourably with "Big Blue's" 22.5%. It is significant to mention that, only three or four months back, NEC APC-III could man-

age no more than four or five per cent of that market.

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## THE DISKETTE AT THE END OF THE RAINBOW

Memron Australia, a Melbourne company, has formed a new diskette manufacturing business that offers the choice of any colour on the cover of the diskette — in fact, not just any colour, but any combination of colours.

The main areas the new diskettes are aimed at are software and hardware manufacturers and large institutions, where they are claimed to offer a number of advantages, and according to Brian Johnstone, Managing Director of Memron, the new diskettes discourage software piracy and data or diskette theft. "If a diskette is uniquely identifiable, as ours are, it's an aid to preventing piracy."

The new disks from Memron will be selling in Australia and New Zealand, where the company hopes to take a five per cent share of the total diskette market. As Memron intends to sell largely to software manufacturers, who account for 10 per cent of the total market, it will be trying to get 50 per cent of this group's business. Other users will include banks, large company departments and government, particularly education departments.

The key to the Memron operation will be the company's desire to cater for the specialist custom-made

market which larger diskette manufacturers are neither in nor equipped to address. Production runs will be small, with initial runs of about 5,000 to 10,000 diskettes and an expected average run of between 2,000 and 5,000 diskettes.

The Memron diskette production operation has the rare feature of using individual plastic sheets to make each diskette sleeve. These are white to allow easy overprinting and the colour range extends to any inks that can be printed on plastic. The only disadvantage of the coloured diskette is the small added cost of an extra 20 to 25 cents a disk.

Some of the equipment used in the manufacturing process, such as the diskette certifier, is the latest on the market. The certifier, which checks for faulty disks, has only been installed in one other site in the world. It is Memron's intention to apply the highest standards of diskette testing. "If a disk fails for any reason we will replace it. When people are using our diskettes to distribute their product, there is no point giving them a diskette that may not be completely reliable," says Brian Johnstone.

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## NEW INTEGRATED SOFTWARE

Responding to user demands for less expensive business software, Software Suppliers has introduced Access Four, a new integrated software package offering the most-utilised



features of Open Access, plus a Desktop Manager and numerous integration enhancements. Access Four incorporates four main modules — Spreadsheet, Graphics, Data Manager and Editing/Reporting.

The modules retain the power and menu-driven ease of Open Access which was developed by Software Products International (SPI). However, the Access Four program makes use of virtual memory, thereby permitting files as large as disk storage will allow.

Files may be joined and used simultaneously by a command language which allows very English-like interactive communications between the user and the database. Additions to the main modules include the 'pop-up' Desktop Manager which offers a globally-accessible appointment book, calendar, triple-time zone clock, address flip-file, advanced calculator, value conversion tool and a scratch-pad which performs many text-editor functions.

Access Four also introduces SPI's mighty new Macros with 'built-in' command language. "The spreadsheet provides the pivotal environment for the other modules, thus permitting the superior integration sought by business users," said Bruce Lamb, managing director of Software Suppliers. "Query strings may be used to establish a database from Spreadsheet entries."

"Three-dimensional Graphics may be instantly generated from Spreadsheet or Data Manager information. All modules are accessed from the main

Spreadsheet menu, while context-specific 'Help' windows offer assistance at the press of a key," he added.

The Spreadsheet goes beyond the time-consuming 'what-if' by incorporating goal-seeking capabilities. This means the user can declare the desired goal (the dependable variable) and the computer will calculate what values the independent variables need to be to achieve the desired result.

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#### **MULTI-USER MICRO SYSTEM FOR SMALL TO MEDIUM SIZE BUSINESS ACCOUNTING**

A multi/single-user accounting package, suitable for small to medium size business operations, is now available from micro systems specialist, Intelligence Australia. Known as CBA (Commercial Business Applications), and hailed as "a software package that can at last take advantage of the most up-to-date hardware", the system is compatible with the most popular hardware and also with most networks. It runs the most popular operating systems, including MS DOS, DOS 3.1, CPM 86 and Xenix.

CBA was developed in New Zealand, where there are currently more than 100 sites operational. Intelligence has already established six sites in Australia prior to the product's official launch, at least 50% of them multi-user. John Cowan, Managing Director of Cowan Bowman Associates, the New Zealand

developers of the package, states that "CBA represents a new generation of software and incorporates features hitherto only available on much larger systems. It is the outcome of many years' research and practical experience in commercial computing, and, as a consequence, a very high level of integration between modules has been achieved."

Advantages of CBA, which is written in Dataflex, include an easy-to-use report generator for any of the system's integrated modules, the option of changing either the system's input or output through the use of the unique gateway facility developed under Dataflex, and very comprehensive aids to facilitate user operation and understanding. CBA has on-line help screens and also tutorial documentation, thus enabling operational know-how to be transferred within user organisations. Demonstration files are included in the package.

Tasks embraced by CBA include Accounts Receivable/Sales Analysis, Inventory, Order Entry (including delivery scheduling)/Invoicing, Accounts Payable, Purchase Orders, General Ledger, Payroll, Cost Management, Bill of Materials and Report Writing. As with all packages from Intelligence, CBA is backed with hardware maintenance, software support, training and consultancy.

INQUIRY 157

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#### **CENTRALIZED FINANCES**

Pearls Pty. Ltd. is one of the world's largest farmers of cultured sea pearls. Until recently, controlling the financial and accounting operations of the business was difficult because its operations covered broad geographical areas, including Broome in North West WA.

Each office was responsible for its own accounting activities including staff payroll, payments and billings. Each office's accounts were then couriered to Pearls' head office in Perth for consolidation. Financial Controller for Pearls, Guy Mirabella, says that the Profit and Loss Statements produced by the Company were limited in value because of the delay in receiving details from each office.

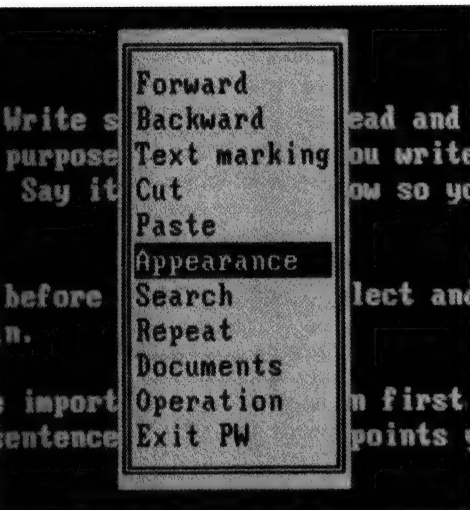
"Now that we have MAPAS (Management And Project Accounting System) we are able to control all our finances from the Perth office, including the payment of our 110 staff and the processing of all our invoices. This gives us an up-to-date picture of our finances, which is the way it should be."

MAPAS, marketed by Framework Information Systems, a part of the PAXUS Commercial Systems Group, is a financial and project control system capable of handling a company's general ledger, as well as ledgers for each project. These include cash payments and receipts, creditors and debtors accounts, control of purchases and stock as well as payroll.

One feature of MAPAS

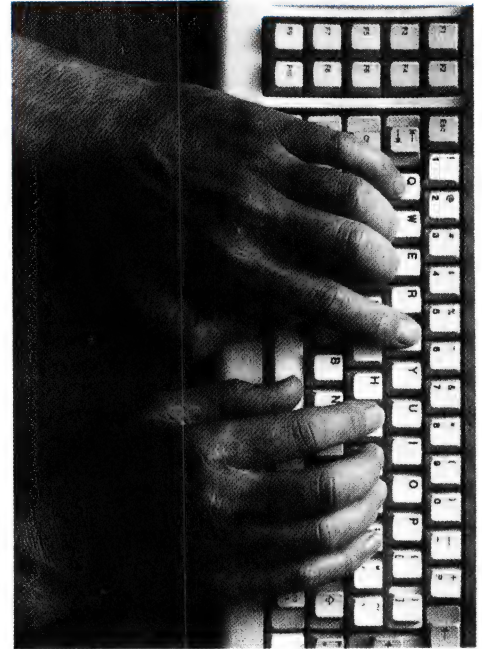


# If a word processing these 8 tools for better



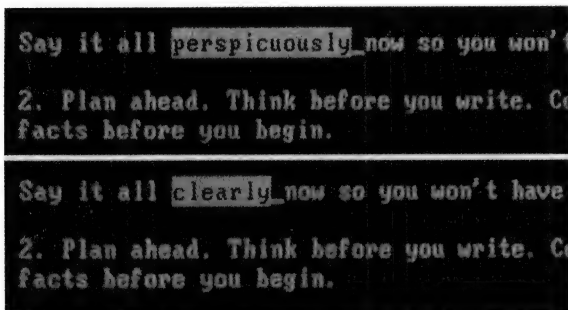
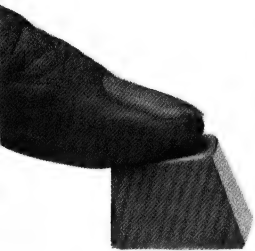
## 1 Pop-up menus—so you can start writing better right away.

You can't write better if you're not writing. So Perfect Writer™ has pop-up menus that make it extra easy to use. They guide you through every function with simple English language words. So you don't have to struggle with complicated commands.



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## 3 Powerful editing features at the touch of a single key.

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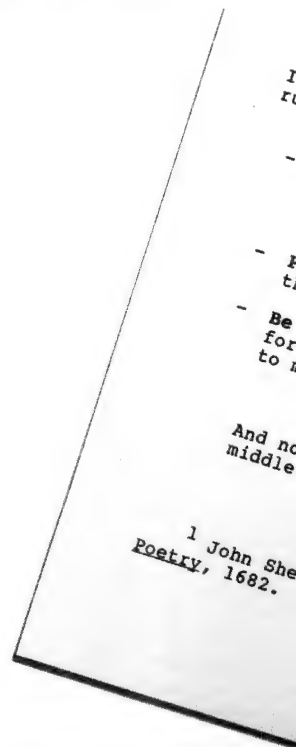
## 4 A 50,000 word dictionary that helps you correct spelling mistakes.

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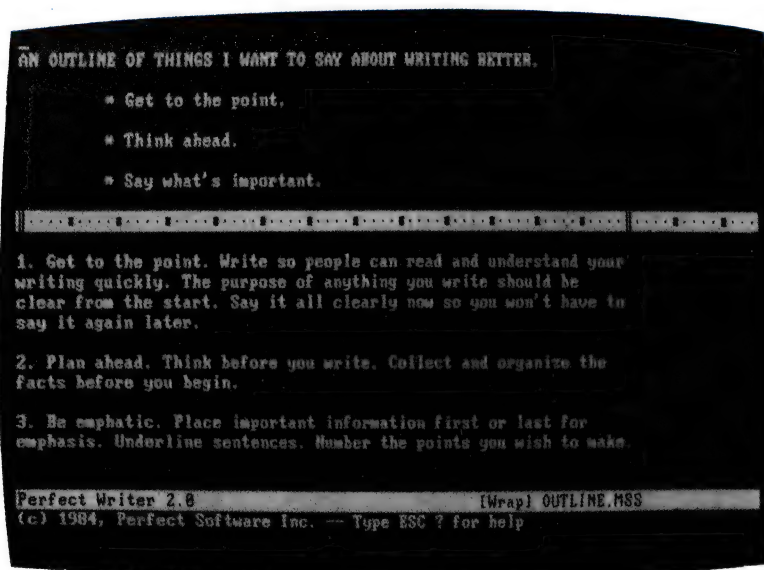
## 5 A Perfect Thesaurus™ to help you choose exactly the right word.

Are you pleased? Happy? Delighted? Good writing should say exactly what you mean! And with our built-in Perfect Thesaurus™ the precise word you want is always at your fingertips.



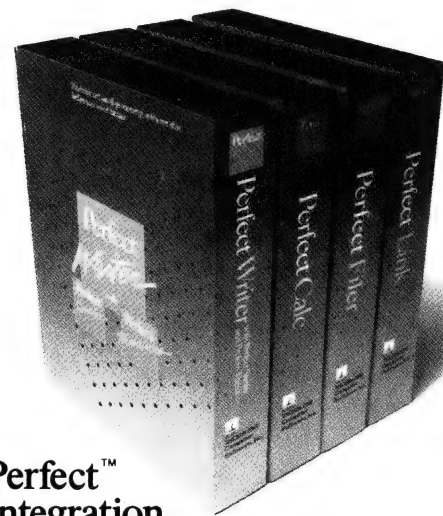


# program doesn't give you writing, it's not Perfect.™



## 6 Split-screen windows that help keep your thoughts organized—while you write.

It's like having a notepad right on your screen. You can use one window to jot down notes, key points or an outline—as you develop your text in the other window. See? With Perfect Writer, you can really compose your prose.



## 7 Automatic formatting to make your writing look even better on paper.

Perfect Writer works with most popular printers. And with our special document appearance features, your letter, memo, report or paper will look like a masterpiece.

It's easy to change margins and spacing to display important quotes. Or key ideas.

Boldface and italics let you write with new emphasis.

If you want page numbers, Perfect Writer can handle it—automatically.

Perfect Writer automatically numbers, positions and prints out footnotes. Whew.

...ing? we all need to write better. Consider the following: Of all those arts in which the wise excel, Nature's chief masterpiece is writing well. 1 Just how important is organized ideas. As a result, they have misspelled words. demos and reports are never be exactly sure of what they're words

Get to the point. Write so people can read and understand your writing quickly. The purpose of anything you write should be clear from the start. Say it all clearly now so you won't have to say it again later.

Plan ahead. Think before you write. Collect and organize the facts before you begin.

Be emphatic. Place important information first or last for emphasis. Underline sentences. Number the points you wish to make.

Put main thoughts in indented paragraphs.

the bad news -- put negative information in the field, Duke of Buckingham and Normanby, Essay on

- 1 -

## 8 Perfect™ integration with other Perfect software.

Perfect Writer is just part of the complete, integrated Perfect Software family. There's also Perfect Calc™ spreadsheet. Perfect Filer™ database management. And Perfect Link™ telecommunications software. You can share information between programs. And, each program uses common commands. So they work Perfect™ together—to help you work better.

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INQUIRY 181



that influenced Pearls to select it over other systems, was an edit list facility which allows the user to check the integrity of data before final confirmation and updating of master files.

"This feature allows us to see the end result of a payroll run we are about to do, check it and make any corrections before it is actually run and the cheques are printed. After that any changes would have to be left until the next payrun," Guy Mirabella said.

The MAPAS system runs on Data General equipment from desktops through to MV10,000 superminis.

INQUIRY 158

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## MODEM SPEEDS COMPUTER COMMUNICATION

The "intelligent" Volksmodem 12, a 1200 baud modem that makes computer communications faster, easier and more affordable for all user levels has just been announced by the Shuttle Datacommunications division of R.F. Computer Communications Pty. Ltd.

Described as a modem to "put basic transportation for data within reach of the masses" — the Volksmodem 12 puts a truly smart modem, including auto-dial/auto-answer capabilities, within reach of everyone.

The Volksmodem 12 has been designed with the user in mind with the modem-to-computer interfacing taken care of with a range of user selectable adaptor cables which are precon-

figured to suit almost all computers and terminals on the market, including Apple, Atari, Commodore, DEC, Data General, HP, IBM-PC and compatibles, Kaypro, Macintosh, Morrow, NEC, Tandy, Televideo, etc.

In addition, the Volksmodem 12 is bundled with the outstanding communications and file transfer software program MITE+ which can be preconfigured for about



130 different microcomputers running CP/M or MS/DOS. This package in most cases also includes terminal emulation for almost 100 different terminals including ADDS, DG, DIGITAL, IBM, LEARN, SIEGLER, TELEVIDEO, WYSE, etc.

All the user has to do is order the Volksmodem 12 for say, a Televideo 1603 and the complete modem, cable and software package will be supplied ready to plug in and use.

Volksmodem 12 is usable on standard two-wire dial-up networks and is Telecom approved for user connection to a standard wall socket. The data set

operates character asynchronously at a data rate of 1200 bits per second full duplex. The unit is capable of full unattended operation in conjunction with stand alone terminals and computers which have an RS232 interface.

INQUIRY 159

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## A HEALTHY SYSTEM

Installation of a microcomputer and integrated accounting software has enabled a group of Eastern States nursing homes to increase operating efficiency in the face of alleged inconsistent and inflexible Government health policies. By combining the management of five homes under one small Melbourne based company, GPM Management Services, a glimmer of hope has shone for the survival of similar institutions in a period of declining profit margins.

Managers of GPM Management Services Pty. Ltd., Russell and Graeme Menere, own one nursing home, a typical small 15 bed institution at Moonee Ponds, and are under contract to manage four others. These range from 15 to 45 beds, and all are located in Victoria except for one just over the border in NSW.

As it is generally accepted that a nursing home needs at least 30 beds to be viable under present Government regulations and levels of subsidy, the combination of several homes under one management is not only more efficient, but essential for survival. Graeme Menere said,

"The reason our business came into being over the past seven years was the continuing decline in nursing home profit margins.

The struggle to survive, let alone progress, under such a system, has seen Graeme become recognised among the top experts on the Health Department control system as it relates to nursing homes. "Previously many nursing homes have been managed by sisters and matrons, but despite their skills, more professional management in the areas of finance and greater knowledge of constantly changing rules, became essential for survival.

As pressure continued to mount, the need for accurate statistical data to present to health authorities became evident — so the need for a computer was recognised.

When choosing the hardware and software for their financial management system, Graeme Menere took the eminently sensible approach of setting down what he required of the software — taking into account the idiosyncrasies of the industry. "We then went shopping and were referred to an independent computer software specialist, who suggested the integrated Sybiz accounting package," Russell said.

Many other systems were reviewed during the search but, in the final analysis, the deciding factor was the ability of Sybiz to provide the necessary statistical analysis of staffing, payrolls and expenditure. "There is no such thing as a



perfect system, but this software is good and it is doing everything we need," he said.

"We are battling with the Commonwealth Government on the level of profits, subsidies and staffing ratios. For that reason we must know a lot about our payroll and expenditure, including penalties for every employee category, to prove that we are neither over nor under staffed. "Because one home is in NSW, operating under different awards and levels of subsidy, the system had to be able to handle all award variations. Cyril Goldberg has made some changes to the software to ensure that our system can produce most of the needed statistical data and we are hopeful it can be supplemented to give us even more," Russell said.

INQUIRY 160

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## CIRCUIT DELAY TESTING

An engineer at IBM's East Fishkill, N.Y., facility has developed a new technique that improves by 10-fold the accuracy of testing very large-scale integration (VLSI) circuit delays. A circuit delay is the time interval introduced by turning on and turning off various circuits on a chip.

The new technique, patented as the "Test Circuit For Turn-on and Turn-off Delay Measurements", solves the problem of knowing, to within picoseconds (trillionths of a second), the circuit speeds of

present-day and future technologies. The computer system designer then uses this knowledge to meet objectives of system cycle-time (the time it takes a computer to complete a given set of instructions).

The new technique eventually will give computers improved price-performance because of simplified setup and test requirements on circuits. In addition, technology development times are greatly reduced.

INQUIRY 161

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## TAPE BACKUP SYSTEM

Cipher Data Products Inc. has packaged its 1/4-inch tape backup technology into an easy-to-use system that will interface with the IBM PC-XT.

Cipher Data's Model 5210 Floppy Tape Backup System™ is the company's first product designed for users in the IBM PC market place and is the first in a series of products designed to support IBM PC-compatible architectures.

The 5210 system draws upon the company's broad

expertise in tape drive technology to fill the increasing need for easy-to-use, low-cost data backup in business and home computers.

The 25 MB system is based on Cipher's FloppyTape streaming 1/4-inch cartridge tape drive, designed to use the industry-standard floppy disk interface and respond to floppy disk-like commands. This scheme enables users to plug 5210 systems directly into the computer's external floppy disk interface connector, eliminating the need for a controller interface card

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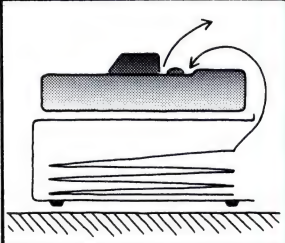
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MAC103

INQUIRY 162



that would require installation and tie up an expansion slot.

The Model 5210 system also features file-oriented, rather than image-oriented, backup so that users can back up specific files or directories as well as the entire disk. This eliminates problems faced by image-oriented systems when a Winchester drive fails and is replaced by a drive with a different bad-sector map.

File-oriented backup also allows users to selectively restore files or directories from the last backup copy rather than having to restore the entire backup copy and wipe out current files that are still intact. The 5210 system can back up two entire IBM 10Mb hard disks or one 20Mb hard disk at approximately one minute per Mb on a single standard, 3M DC600A 1/4-inch tape cartridge. Larger disks can be backed up on multiple cartridges.

In use, the 5210 system adds just three new commands to PC-DOS for backup, restore and format functions. These commands are functionally compatible with the existing PC-DOS commands for these functions and use the same syntax.

Before a backup or restore command is initiated, the unit reads the cartridge and informs the user if the cartridge has existing files on it and when the files were created. Users may select from a list of command options, including whether they wish to back up or restore only specific files or files created after a certain date.

Data-protection features

prevent users from running over existing data or loading multiple cartridges in an improper sequence during the backup or restore process. The system also can be instructed to read each file generated on the cartridge, and log and display information about sectors with errors. An error-correction scheme corrects single errors and detects multiple errors.

The 5210 system's simple installation procedure eliminates the need for a separate controller, making it easy for users to unplug the unit and transport it to other computers, if necessary, rather than dedicating a single backup system to each computer.

INQUIRY 163

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### TRANSPORT COMPANY SOFTWARE

A Sydney-based transport company, Riteroad Transport Group, is finding its new computerised Courier Accounting System from Transoft Corporation Pty Ltd enables it to save accounts staff up to three days a week in paperwork.

This system was designed specifically to handle the intricacies of the courier and transport business.

Transoft Corporation, a Sydney-based software development company and time-sharing bureau specialising in the transport industry, has been developed to handle the complex charging structures for courier companies of all sizes. "Prior to installing the NEC APC and the Effective software, our weekly



accounting was handled by a bureau. There was a lot of work in preparing the information for the bureau, then checking and amending it before invoices could be sent out. Now everything is in-house, I am saving considerably on paperwork, said administration manager Mrs Clarke.

Mrs Clark said it was now possible to provide exactly all the information required by each customer on each invoice. Some customers required specifics of pick-up and delivery locations, and others needed authorisation codes or divisional identities. Based in Sydney's outer western suburbs, the Riteroad group handles all types of local and interstate transport tasks, the majority of which are for companies within the manufacturing industry. The company also provides a taxi truck service and incor-

porates a courier company.

The Courier Accounting System is available in four separate modules — invoicing, debtors, sales analysis and driver payments. The software package is easy-to-use as it is completely menu driven with English language prompts to assist the operator — in fact Mrs Clark was happily using all aspects of the system within a couple of weeks, with no training required. It is fully interactive — the entry of a document immediately updates all relevant files.

INQUIRY 164

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### PAPERBACK SOFTWARE LAUNCHED IN AUSTRALIA

Adam Osborne may be the most creative entrepreneur yet seen in the fast-moving computer industry. Credited with having virtually invented the computer



book industry — his first title, "An Introduction to Microcomputers" has sold 350,000 copies — and later developing the first briefcase-sized personal computer, he has dazzled the industry with bold, innovative approaches to marketing, packaging and design.

Now he has launched a new company. Paperback Software International introduced its first four products onto the U.S. market in December, 1984. Software Corporation of Australia has been appointed exclusive Australian distributor for the imprint and has recently delivered stock to dealers throughout the country.

The initial product offering under the Paperback label comprises:

- **EXECUTIVE WRITER**  
A powerful full-featured word processor for the IBM Personal Computer. Allows the user to create, edit, save, retrieve and print documents in minutes. Complete on-line help screens are included. Comparable with other word processors costing A\$400 to A\$600, but priced at A\$99.50
- **NUMBER WORKS**  
The first budget-priced spreadsheet to become available for the IBM PC. Windows allow the user to see up to eight different parts of the worksheet at the same time. Comparable with other products costing A\$400-A\$800, retails at A\$79.50.
- **MY A-B-C's**  
Six educational and entertaining games for children from four to

eight years old, teaching letters, numbers and symbol-matching. Recommended retail: A\$39.00.

- **PAPERBACK WRITER**

A simple entry-level word processor for users whose needs do not justify the expense of a full word-processor. Includes all basic W.P. functions including global search and replace, on-screen bold and underlining and block operations. Retail price A\$79.50.

- **DRAW IT**

A high quality graphics program that turns the PC screen into a full-colour electronic drawing board. Copies, moves, rotates and scales illustrations; creates presentation business graphics; and can capture and modify pictures from other programs. Suggested retail: A\$49.95.

"The Paperback line is a novel approach at delivering keenly-priced software," said SCA Director of Marketing, Arnold Roth, in announcing the new products. "The product design is outstanding. It allows the browsing customer to look right through the clearly written manual, at the same time protecting the diskette from damage or interference. It makes a lot of sense in the current retail environment," he said.

All Paperback Software products come packaged in the form of a paperback book, with the diskettes being firmly protected within a sealed cardboard sleeve, thus preventing any da-

mage from careless handling on the shelf. The books are not shrink-wrapped because Software Corporation wishes to encourage browsers to look through the instruction manual and get a "feel" for the product — something which often cannot be done with conventional software products.

INQUIRY 165



## SOFTWARE PACKAGE

SAVVY PC combines artificial intelligence capabilities, an operating system with virtual memory management, an adaptive pattern recognition processor, a highly structured programming language and a fully relational database manager into a single integrated system. Although well established in America, it has recently been introduced into Australia by Aladdin Computer Services. It runs under the MS-DOS/PC-DOS operating systems, Versions 2.0 and later, on the IBM PC and most compatible microcomputers.

The structure and simplicity of the programming language significantly cuts development and programming time. The system includes a highly intelligent editor which checks the validity of all words entered, prompts for operands and indents program structures within loops, IF .. END, etc.

SAVVY initially contains about 250 functions to deal with arithmetic, adding to and changing the vocabulary, keyboard control

and input, screen and printer control, character and bit manipulation, date and time handling, program structure, internal (SAVVY) and external (DOS) file handling, telecommunications, pattern and query processor and control of its own environment.

The vocabulary can be expanded by building tasks and functions. These may individually be simple, but can be combined to form very complex programs which are completely modular and may contain up to 20 Megabytes of code. Any word in the vocabulary may have other names associated with it. For instance, ADD may also be called INCREMENT, + or ADD 'EM. To assist further, SAVVY is able to understand imprecise instructions.

SAVVY includes a database manager and report writer written in SAVVY, and RETRIEVER which is the natural query language for SAVVY files utilising the pattern recognition capabilities of SAVVY. RETRIEVER can learn about files or parts of files so that queries can be phrased in natural English. All source code for the database manager is supplied, including the code which generates the database manager code.

INQUIRY 166



## MACLIBRARY SOFTWARE SERIES

Microsoft Corporation has announced the MacLibrary™ software series, a new software publishing effort by the



leading independent producer of Apple Macintosh software. Microsoft MacLibrary releases will complement Microsoft's existing software line with a series of products priced from A\$100 to A\$250. The software series will include many categories new to Microsoft, including education, recreation, and home products.

"Microsoft strongly believes in the graphics-based software environment of the Macintosh," said Linda Graham, Managing Director of Microsoft. "MacLibrary offers an important way to round out our existing product line and bring innovative, high-quality Macintosh software to the marketplace more quickly."

With venture capital increasingly rare, many ISVs (Independent Software Vendors) have found it difficult or expensive to market their products. Through Microsoft MacLibrary, software authors can take advantage of Microsoft's extensive marketing, manufacturing and distribution resources. The authors are responsible for software development and product support, such as program documentation.

Microsoft is requiring prototypes from Australian and U.S. contributors, not merely concepts. "We're looking for people who have put a lot of time and effort into developing a good program," stressed Graham. "We're supplying an alternative channel for developers to bring their programs to the market. In addition, since MacLibrary programs are put through Microsoft's rigorous quality

control process, the consumer will be guaranteed quality products."

Third-party authors will not only benefit from efficient manufacturing and a world-wide distribution network, but also from Microsoft's name recognition and reputation. The software company can virtually guarantee authors shelf space in retail stores throughout the world. Third-party authors can also take advantage of Microsoft's expertise with software in general, and Microsoft's expertise with the Macintosh in particular.

Microsoft has announced the first two programs in the Microsoft MacLibrary software series: Learning Microsoft Multiplan and Microsoft Chart, and Entrepreneur™. Learning Microsoft Multiplan and Microsoft Chart, by Micro Courseware Corporation, is a tutorial on the basic and advanced features of these two best-selling Microsoft application programs. Entrepreneur, by Harvard Associates, Inc., simulates the management of a software company. Learning Microsoft Multiplan and Microsoft Chart is available immediately and will retail for A\$115. Entrepreneur will also retail for A\$115.

Future releases planned for the Microsoft MacLibrary software series include productivity aids, language tools to complement Microsoft BASIC, educational software for adults — both university level and self-improvement programs — and home products for finance and banking. With each publishing effort, Microsoft

will continue to pursue software that takes special advantage of the unique characteristics of the Macintosh.

INQUIRY 167

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### SOFTWARE CLUB INTRODUCES "HANDS OFF" SHOPPING

Newcomer to the computer marketplace, Strategic Computer Club, has perfected "hands off" software shopping for the personal computer enthusiast. A mail order software service which has been in operation only a few months, Strategic already has over 12,000 members and is growing at a rate of over 500 members each week.

Club President, Frank McIntyre believes the club's success is due to the wide range of software packages carried, and the public's increasing acceptance of mail order shopping. "With home computers now moving into mass marketing outlets, users no longer have access to a wide range of software," he said. "We aim to satisfy that need, by selecting quality software, describing it in a free club magazine and offering it to members at the best possible price."

At present Strategic caters for Commodore 64 and Apple users but intends to widen its range later in the year. Its regular newsletter describes hundreds of packages currently available and the Club is able to obtain other hard to get software on behalf of members.

Frank said most software programs reviewed in major computer magazines were available through Strategic in the fields of entertainment, business, home management, and education. With the popularity of mail order growing throughout Australia, Strategic has established an efficient, high-tech operation in order to keep pace. To handle its membership inquiries and orders, Strategic has installed a sophisticated Qantel Model 60 computer utilising custom written mail order software.

INQUIRY 168

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### LOCAL MANUFACTURE OF IEEE-488

Australian cable manufacturer, Data Cable Pty Ltd, is the first company in Australia to manufacture the import replacement of General Purpose Interface Bus (GPIB) shielded cable assemblies for IEEE-488 panel-mounting applications. Until now, these have been fully imported. IEEE-488 cables are interface cables, used to transmit data from remote instrumentation to computers, particularly in the medical, scientific and mining fields.

Managing Director of Data Cable, Mr Jim Doriean, said that the IEEE-488 cables are manufactured to the highest possible standards and are double shielded to enhance system performance and control capacitance, electromagnetic interference and cross-talk.



"The cable assembly comprises a shielded multicore cable designed specifically for GPIB, terminated with two 24-way back-to-back plug and sockets."

Insulation-displacement contacts provide low and stable termination contact resistance, while a two-piece, nickel-plated die-cast aluminium shield assures complete shielding against electromagnetic emissions and RFI. This highly durable shield is integrally connected to the shielded cable.

The Data Cable GPIB meets the new FCC (Federal Communication Commission) regulations, Docket No 20780, and is compatible with IEEE-488 standards.

"In addition to Data Cable securing the Australian market with its locally produced, high quality IEEE-488 cables, a large percentage is intended for export to the United States, Europe and Asia," said Mr Dorian.

"Data Cable is the only company in Australia manufacturing the IEEE-488 cable, and its new capability has already attracted a great deal of interest from overseas companies keen to gain offset credits with the State and Federal Governments. "The Victorian and Australian Governments' Offset Programs require that overseas suppliers of high technology equipment enter into supply or co-operative arrangements with Australian industry for a set portion of the supply contract's value.

"Purchase of GPIB IEEE-488 cable assemblies

is a particularly attractive proposition to OEM's, because the cables can be custom made with their own or customer logos, or, alternatively, we can supply them ex-stock," Mr Dorian said.

INQUIRY 169

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### AWA EXTENDS MICROCIRCUIT CAPABILITY

Amalgamated Wireless (Australasia) Limited (AWA) has acquired an important software exchange agreement and over A\$1.5 million worth of new design equipment which will significantly increase the capabilities of Australia's electronics industry. The agreement with the RCA Corporation in America, originators of CMOS technology, provides AWA with the most advanced design software in the world. This software, combined with the computer aided circuit design equipment just installed at AWA's North Ryde, NSW, plant, will mean major advances for the company's microcircuit capabilities.

Over the past 20 years, AWA has produced the only custom designed integrated circuits totally designed and manufactured in Australia. General Manager of AWA's Microelectronics Division, Dr L. W. Davies, claimed that the new software will enable the company to greatly speed up the design process for integrated circuits.

"From specification start, we will now be able to deliver a custom integrated circuit in weeks rather than

months. The software will also enable us to simulate a circuit's electrical performance, when implemented on a silicon chip, before it actually goes into use. This reduces design errors and ensures correct performance first time when committed to silicon. Our facility will have a broader range of services than many other such facilities in the world, most of which are located in California. It will also enable us to perform work for Australian organisations who would otherwise have sent their specifications to the U.S.A. for design and manufacture. Additionally, the new facility opens up real opportunities for export markets in Asia and Europe. The high quality of Australian design engineering gives us a real competitive advantage in these markets. Indeed, it is AWA's excellent design reputation overseas which underpinned the successful negotiation of the unique software co-operation agreement with RCA," Dr Davies said.

AWA and RCA have embarked on a program of continuous co-operation, under which software enhancements and personnel will be freely exchanged. AWA is confident that custom digital integrated circuits, identified as the fastest growing component of the international integrated circuit market, represent a strong growth area within Australia. "We expect to produce around 200 designs per year from now on," said Dr Davies. "Design stations may be established by AWA elsewhere in the Pacific

Basin. Emphasis will be placed upon such advanced end-user applications as telecommunications, industrial control equipment, defence systems, medical electronics and computer processing," Dr Davies said.

INQUIRY 175

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### A LETTER-QUALITY DAISYWHEEL PRINTER

Mitsui Computer, importer and distributor of office automation and communications equipment, has released the JUKI 6300, a low-cost, high speed (40 cps) daisywheel printer which is the latest addition to the Juki family of printers.

The JUKI 6300 has escape sequence codes which are compatible with Diablo 630 API, and supports many word processing features, including auto-underscore, proportional spacing, auto justify, bold printing, shadow printing, auto centering and program mode. It is compact and quiet and has features usually only found in more expensive printers, for example, a 3K memory buffer that can be expanded to 15K and a 16 inch platen.

The JUKI 6300 takes Diablo plastic daisywheels, which allows the operator a choice of over 50 different font styles. Additional attachments available with the JUKI 6300 printer include single and dual bin sheet feeders, as well as a tractor feed.

INQUIRY 176

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# B·Y·T·E·L·I·N·E·S

## Conducted by Sol Libes

Congratulations to Altos for being the first company to introduce a system using the Motorola 68020 microprocessor, a true 32-bitter. The Altos 3068 runs UNIX System V and will handle up to 30 users.

At the January Consumer Electronics Show, Atari's Jack Tramiel (chairman of the board) promised the company would ship 5 million of its new ST-series machines this year. In March, Atari's president, Sam Tramiel (Jack's son), cut the prediction to just over a million units. Rumors now are that Atari will not start shipping the ST in earnest until this month, which would make it difficult to achieve the revised goal. Meanwhile, Leonard Tramiel (another son) revealed that Atari plans an OEM version of the 68000-based machine as well as a local-area network for the system. It is expected that the LAN will use the ST's MIDI (musical instrument digital interface) port and operate at 31.25 kbps. This would make it slower than the AppleTalk net but faster than LANs using RS-232C interfaces.

Digital Research is expected to add an MS-DOS emulation feature to the GEM operating system running on the new Atari 68000-based computer, meaning that users may be able to run many of the programs written for the IBM PC.

Manufacturers of clones are moving from the IBM PC to the PC AT marketplace. Expect Tandy, Hewlett-Packard, Wang, Honeywell, Philips, Siemens, Ericsson, and AT&T (plus several Japanese, Korean, and Taiwanese companies) to introduce AT-compatible machines before the end of the year. Compaq, Xerox, NCR, Texas Instruments, Zenith, and Kaypro already have AT clones out. There are even rumors that Apple is seriously considering producing one. Most are expected to run faster than the AT and have display circuitry compatible with IBM's Enhanced Graphics Adapter (EGA). Chips and Technologies, a custom IC maker in San Jose, CA, is reportedly attempting to reduce the EGA from 150 to 23 ICs.

Also, rumors are going around that General Electric and AT&T have attempted to acquire Apple Computer.

### IBM RUMORS AND SPECULATIONS

The long-rumored PC II is expected to be officially announced by IBM next month,

with shipments to users starting in the fall. . . . Industry pundits expect that this fall IBM will bring out a more powerful and faster version of the AT running UNIX System V and handling up to 16 users. . . . Rumors say that IBM may put TopView into ROM on future PC products along with a new operating system being developed in-house. . . . Expect IBM to introduce a laser printer with much better dot density than current Apple and HP printers.

Future Computing of Dallas predicts that IBM will sell 350,000 ATs this year worth \$1.6 billion. The people there estimate that in 1984 IBM shipped 90,000 ATs worth \$500 million.

Expect IBM to shortly switch to 3½-inch floppies. IBM has ordered 1.5 million 1-megabyte disks from Toshiba, Alps, and Matsushita.

It is estimated that IBM, at the time the company announced it was ceasing production of the PCjr, had around 350,000 units in its warehouses. There are reports that IBM, in an attempt to move large quantities of the units, offered them to liquidation brokers for \$80 each but did not get any takers. There are also reports that IBM, this spring, had as many as 600,000 XT's in stock. In an effort to move them out of warehouses, IBM reduced the XT price by 12 percent, included several software packages, and also began selling PCs with XT motherboards. The feeling is that the introduction of the AT last summer severely undercut sales of the XT. Further, IBM raised the price of the PC to discourage dealers from upgrading PCs to XT's using non-IBM components. In any event, IBM's overstocked warehouses appear to be the cause of the delay in the introduction of the PC II.

Some reports say that IBM is putting the squeeze on independent suppliers of software packages that it distributes. Currently, these companies give IBM 40 to 60 percent discounts. It is reported that IBM is now asking for 70 percent discounts.

### APPLE BYTES AND PITS

First there was the Macintosh with 128K bytes of RAM, quickly followed by the Fat Mac with 512K bytes. Now, industry watchers expect Apple to soon introduce a 1-megabyte Mac. Apple already offers

a 1-megabyte plug-in RAM card for the Mac XL (née Lisa 2).

The 1-megabyte Mac should improve performance, particularly for memory-hungry spreadsheets and font-generating programs. It would also encourage a RAM-disk operation to compensate for the Mac's slow disk access.

Several companies already offer do-it-yourself Mac memory add-ons of up to 2 megabytes, and we can expect these independents, when 1-megabit chips become available, to offer 4-megabyte RAM upgrades (the maximum addressing limit of the Mac). These upgrades require opening the Mac and soldering to the main processor board, a violation of Apple's warranty, and is not recommended for the inexperienced. Levco Enterprises (11568 Sorrento Valley Rd. #14, San Diego, CA 92121) and Beck-Tech (41 Tunnel Rd., Berkeley, CA 94705) offer such kits. Levco also offers a motorless, piezoelectric fan to cool the 2 megabytes of RAM.

I also hear rumors that Apple may introduce a new version of the Mac with a bus-expansion slot, a feature being asked for by value-added retailers. Also expected is a doubling of the ROM from 64K bytes to 128K bytes to improve and expand the operating system. The likelihood is that Apple will offer a new dealer-installed enhanced processor board for the 350,000 Macs already sold. However, Apple will have to figure out how to make this upgrade more popular than its \$995 upgrade from 128K bytes to 512K bytes, which created a great deal of resentment among Mac owners, many of whom did not take Apple up on the offer.

Finally, Apple is expected to introduce an Apple II with the Western Design  
(continued)

BYTELINES, news and speculation about personal computing, is conducted by Sol Libes, the author of numerous books and articles on computers. He is the founder of the Amateur Computer Group of New Jersey and a coorganizer of the Trenton Computer Festival. He edits and publishes Micro/Systems Journal, a bimonthly publication for system programmers and integrators. He can be contacted c/o BYTE, POB 372, Hancock, NH 03449.



Center 8-/16-bit 65816 microprocessor. Look for it to be introduced at Apple's January stockholders' meeting. There is some question as to whether Apple will provide an upgrade kit for the current 2.5 million Apple II users. If Apple doesn't do it, you can bet somebody else will!

## MICROSOFT TO INTRODUCE MS-DOS 4.0

Late this year, Microsoft is expected to release version 4.0 of MS-DOS, the primary operating system for the IBM PC/XT/AT family of computers and compatibles. Version 4.0 should add multitasking and a virtual memory space in excess of 640K bytes. Multitasking is expected to improve the operating speed of Microsoft's Windows environment. Currently, the only way to get PC software-compatible multitasking on PC-compatible machines is with Digital Research's Concurrent DOS. The latest version of Concurrent DOS (4.1) also includes the GEM user interface.

Also, version 5.0 of MS-DOS is reportedly in development, designed specifically for the 80286 processor. It should execute programs in the 80286 protected virtual-address mode.

## INTEL UNWRAPS 386

Intel is expected to shortly make a formal announcement of its new 80386 32-bit microprocessor. For the first time, Intel finds itself running behind National Semiconductor (already shipping production quantities of the 32032), Motorola (sampling for close to a year and ready to start 68020 production), and AT&T (selling its 32-bitter to OEMs). Production of the 80386 is not expected until next year. This means that the first computers using the device may be introduced by late 1986.

The 80386 is expected to be upward-compatible with the 80286 (used in the IBM PC AT), contain more than twice the number of devices, and be two to three times faster. It should have on-chip memory management, with a protection feature, to work with up to 4 gigabytes of physical memory and 64 terabytes of virtual memory.

## MEMORY SIZES INCREASING

In Japan, large-volume pricing of 256K-bit RAM chips is already less than \$4 each, with 64K-bit chips less than \$1. Toshiba, NEC, Hitachi, and Fujitsu are expected to start sampling 1-megabit chips by year's end. Such chips should start appearing in equipment in 1987, earlier than previously expected, making the life of 256K-bit chips

shorter than the 64K-bit and 16K-bit chips. The base RAM memory size in 1987 is expected to be 1 megabyte, compared to the current 256K-byte and previous 64K-byte standards.

ROM size is also growing. Several companies are sampling 1-megabit ROM chips organized as 128K 8-bit words or 64K 16-bit words. This means that the entire operating system for most personal computers can now be in ROM, allowing faster operation and freeing up valuable disk space. HP already has a UNIX portable machine with the operating-system kernel in 256K bytes of ROM. Further, plug-in application-software ROM cartridges will contain larger programs.

## MICRO MARKET IN SLUMP

A definite slowdown in personal computer demand developed in the late spring of 1984, just as many manufacturers, carried away with the euphoria of the early 1980s, brought increased production facilities on line. This resulted in an inventory buildup for most manufacturers. (IBM reportedly had \$1.8 billion of finished goods plus \$300 million of parts in inventory.) Many companies attempted to cope with the situation with special promotions during the fall and Christmas seasons. IBM cut the price of the PCjr and included a color monitor and software, which brought the list price of a complete system down to less than \$1000 (with a street price of substantially less than \$900). Apple, Commodore, and Atari also offered special prices to move inventory out of warehouses. This policy proved effective in moving out a lot of systems, particularly during the Christmas selling season.

However, since the first of the year, manufacturer inventories have soared as demand fell off again. Some manufacturers have restored higher prices. For example, IBM raised the price of the PCjr to more than \$1400 and saw demand for the unit shrivel to virtually nil.

Apple had such a buildup of inventory that it closed all its plants for a week in March and forced employees to take a vacation. Also, it offered dealer rebates of as much as \$300 in an attempt to get Apple IIs and Macs moving again.

## SINCLAIR GOING WSI

Sinclair Research, the British company that startled the industry with its inexpensive ZX80/81 microcomputer just a few years ago, is rumored to be planning a new breakthrough. It is expected to introduce late next year a portable system (tentatively called Proteus) using wafer-scale integra-

tion (WSI) and the flat-screen display currently being used in its pocket TV. WSI is expected to allow several megabytes of memory to be built on one wafer. Sinclair is now in the initial stages of constructing a factory to build an estimated 300,000 units a year.

## A PC CLONE FOR LESS THAN \$900

I just came back from attending the Trenton Computer Festival. This event held every April has the largest personal computer flea market in the country. With components I purchased at TCF, mostly from Taiwan, I was able to put together a very close copy of the IBM PC for less than \$900. If you are looking for the best prices on microcomputer equipment, I suggest you check out computer flea markets held in your area. At TCF I also was able to buy supplies at incredibly low cost (e.g., DS/DD floppies for 70 cents each). If you want specific information on how I built my clone, send me a stamped self-addressed business-size envelope. Send it to POB 1192, Mountainside, NJ 07092.

## ZILOG DELAYS Z80000 AND Z800

Zilog has again pushed back introduction of its Z80000 32-bit and Z800 super 8-/16-bit (Z80-compatible) microprocessors to the spring of 1986. If Zilog does manage to ship samples when promised, it will be a full six years since announcing it was developing the units.

Zilog, owned by Exxon, has shown a profit only one year in its 11-year life and recently cut 400 people from its payroll. Although a pioneer in microprocessor development, with its Z80 and Z8000 8- and 16-bit microprocessors, it has suffered from a reliance on microprocessor manufacturing, while competitors like Intel, Motorola, and National Semiconductor have used microprocessors as loss leaders to sell memory and other types of ICs.

## RANDOM BITS

Novix, Cupertino, CA, has introduced a 16-bit microprocessor that directly executes the FORTH language. . . . A catalog issued by Markline Co., Belmont, MA, features a \$39.95 electronic toaster using a microchip to assure uniform toasting. . . . For the first time, it appears that there will not be a waiting list for booth space at this month's National Computer Conference. . . . Hewlett-Packard, long a pioneer in the computer business (first to introduce the touchscreen, the 3½-inch disk, a UNIX portable, etc.), is expected to be the first company out with a computer optical-disc unit. ■





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## B·Y·T·E W·E·S·T C·O·A·S·T



# SNOBOL and Icon

Language  
designer  
Ralph  
Griswold  
looks at  
his language

BY EZRA SHAPIRO

**D**uring the course of 1984, three implementations of SNOBOL dialects appeared on the microcomputer language market (see page 350). SNOBOL, a convoluted acronym for "string-oriented symbolic language," emerged from Bell Laboratories in the mid-1960s and has been a staple of the mainframe and minicomputer environments ever since. It's a unique language with an unusual syntax, geared to text processing and string pattern matching. Because SNOBOL is unlike any other programming language, it is still taught in many computer science departments. It has also spawned a loyal community of users who find it the easiest way to solve programming problems involving nonnumeric data. However, because the language has never been sold commercially, it has remained something of an oddity . . . although it has refused to die. The most widespread version of the language, SNOBOL4, has changed little since its release to the public domain in 1968.

One of SNOBOL4's authors, Ralph E. Griswold, now teaching at the University of Arizona, has gone on to create a new language called Icon that combines many of SNOBOL's facilities for string analysis with more traditional control structures—although its philosophy and operation are anything but traditional. Icon is not yet available for personal microcomputers in any commercial form.

Early this year, Bruce Webster and I got a chance to chat with Griswold about SNOBOL, Icon, and computer languages in general. We found him to be charming, outspoken, and bemused by the sudden spurt of interest in SNOBOL.

BYTE: It's funny, when you look at the "hot new languages" and start looking back at SNOBOL4, you notice that a lot of the concepts—things like list processing, goal-directed programming, and object orientation—have always been a part of SNOBOL. Griswold: Part of the reason for that is the philosophy we had at the time we developed SNOBOL4; we tried to find things that would make life easier for the programmer—not necessarily for the implementor. We kind of let ourselves freewheel with SNOBOL4. We didn't know a lot of computer science; we weren't constrained by knowledge. We were more concerned with

facility than efficiency at that time. We thought that human beings were more valuable than computers, which is something people forget.

I think a lot of things in SNOBOL4—list processing, so-called object-oriented processing, even a strong coherent system for string processing—have not been in later languages because of concerns about implementation.

I'll give you an example. In SNOBOL4 a string is a data type; it's not an array of characters. It's a type in its own right; a string is a data object. That's a concept that's still not generally accepted in programming languages. Even in C a string is essentially still an array of characters, and there's a difference, a substantial difference as far as the user is concerned.

But those ideas were going on back then. They're not really new ideas; they've just achieved a level of public acceptance that they didn't have then.

BYTE: Has the major interest in SNOBOL over the years been in the humanities community, for things like syntactic analysis?

Griswold: Well, that's a major component of it—people doing research in the humanities have always been SNOBOL fans. PL/I took over at some point as being the predominant language because many of these people were at IBM mainframe facilities, and SNOBOL4 is not officially supported by IBM. SNOBOL4 became the language of choice for computing in the humanities in Europe, more so than in this country, because they have so much textual material to process. There's always been a substantial user community there.

But people using SNOBOL4 cover every application imaginable except perhaps business applications. Systems programmers use it a lot when they have data-processing jobs to do—processing compilers, reformatting things. There's a lot of scientific programming; people working in molecular

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BYTE West Coast is prepared monthly by BYTE's editors and staff in San Francisco and Palo Alto. Correspondence should be addressed to BYTE West Coast, BYTE Magazine, 425 Battery St., San Francisco, CA 94111.



genetics or areas where the data is naturally nonnumeric do a lot of work with it. For a long time there was (and maybe still is) a fair amount of use of it in the federal government in classified departments—particularly for cryptography. The CIA and the NSA used it quite a bit for some time.

The major use of the language has

been in academic institutions. It's a traditional part of the curriculum in courses in comparative programming languages at upper division levels and lower graduate levels, as a language that's sufficiently different to be interesting from an intellectual standpoint.

BYTE: *Availability is always a critical factor.*

Griswold: That's true. The success of SNOBOL4—to the extent that you would call it successful—is due to its availability, the fact that it's in the public domain, it's been supported for a great deal of time, it's essentially free in most of its implementations.

What usually makes a language available is when a computer manufacturer supports it officially. For very good reasons, computer manufacturers don't want to support a wide range of products, particularly those that are out in left field somewhere, because it's a very expensive process to support products like that—distribution, documentation, the maintenance burden. Something has to be really in demand before somebody will officially support it. If a company decides to make something available, then it comes into widespread use no matter how bad it is.

SNOBOL4 has never been officially supported by any organization. It's always been unofficial. Even at Bell Laboratories it was unofficial. There was never an official SNOBOL project there; it was done as a by-product of other work. It was never budgeted, it was never officially acknowledged. It was released but not marketed.

With the personal computer community and the computer networks, software is becoming more readily available, and that's going to change things. Sometimes it takes longer than one expects for the change to occur. In the case of SNOBOL4, the three PC implementations all came out within a few months of each other. After years and years and years of people talking about it and saying it couldn't be done, all of a sudden three of them came out. Until they did, I wasn't sure anybody would ever do it.

BYTE: *Is SNOBOL going to go through another round of evolution at this point?*

Griswold: I've talked with the implementors and know the pressures they feel on both sides, the advantage of remaining compatible with existing programs versus the desire to take advantage of the nature of the computing equipment and facilities that

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***The Next Monthly Issue***  
***of***  
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*will contain selected articles*  
*from*  
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*'Icon is competition  
for SNOBOL4; it's a  
successor to it in a  
sense. Most people  
prefer it to SNOBOL4.'*

are available at the present time. I've advised them to make compromises. Maintain the integrity of the language, but not at the expense of making it awkward and out of date or out of kilter with the computing context in which people are using it. That includes things like input and output, memory use, and so forth.

There's another point that inhibits them besides the desire to be compatible. They're working from existing implementations; they're not starting from scratch. They're taking generic implementations, the original SNOBOL4 implementation, called the SIL implementation, which was done in the 1960s, and Macro SPITBOL, which was done in the 1970s. Those are portable, generic systems, and all but one or two implementations of SNOBOL4 work from them.

I don't think anybody's going to do a language redesign for several reasons. It's not a language that most people will be able to implement starting from scratch. People learn in compiler courses how to write implementations of Pascal; there are a lot of tools for this—it's conventional knowledge. SNOBOL4 is complicated, difficult, sophisticated, the algorithms are not obvious, the implementation techniques are arcane. Very few people have attempted to implement it from scratch, and many of those have failed to implement the most important features of the language. It's a lot of work. I don't think there's enough motivation for anyone to undertake that; not that people don't exist that can do it, but it's not something an average programmer can sit down and do. A person who can write a C

compiler might not be able to implement SNOBOL4.

And I think there's enough wrong with the language that changing it represents a very substantial problem, not just in the implementation, but in deciding what to do with the things that are wrong with it.

What does happen is that people write preprocessors for SNOBOL4 to make it look more palatable to the user. I've done that myself with some success. But that's not quite the same as redesigning the language.

The other thing is that it's got competition. Icon is competition for SNOBOL4; it's a successor to it in a sense. It wasn't designed to replace it, but it's a product of the same work. Most people prefer it to SNOBOL4. So there's enough competition there that I think that someone would be reluctant to invest the person-years of effort it would take.

BYTE: Tell us about Icon. Where did it start?  
Griswold: It didn't start anywhere really; it sort of crept up behind us.

SNOBOL4 was developed at Bell Laboratories by a small group of people who needed a tool for doing something. We weren't language designers and we weren't computer scientists; we had some text to process (symbolic mathematics, in fact). So we just sat down and wrote something because we didn't have anything else. It was so successful we turned from solving the problem to becoming language designers.

FORTRAN was a tremendous triumph in terms of language design, but the designers had available to them a repertoire of mathematical notation, operations, and syntax and semantics that people were used to. There was nothing like that for string processing; I mean, nobody processed strings seriously until computers came along—it's too much trouble. Short of algebraic operations, there wasn't any accumulated body of knowledge on which to base the linguistic facilities—and they're hard to implement, especially on conventional architectures that aren't de-

(continued)

# Attention All Computer Businesses

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*'With Icon, you can  
write an easy program  
that's quick and dirty—  
use it once and  
throw it away.'*

signed for this kind of thing. We became interested, from a research point of view, in linguistic facilities for string and list processing, and in implementational techniques.

I came here to the University of Arizona in 1971 from Bell Laboratories and got funding from the National Science Foundation, and it's been funded since then. That's 15 or 16 years of continuous funding in this

area. We've been working on developing programming languages for processing nonnumerical data and techniques for implementing them—the two going hand in hand.

This is a research project; it's not designed to produce another programming language—there are too many of them already—or a commercial product, but it's nice when your research can produce a by-product that's useful in the computing community. Every so often we've gotten to the point where the results of the research needed to be embodied in a working programming language; we've implemented it and made it available to the computing community.

There was a language called SL/5 following SNOBOL4. SL/5 stood for "SNOBOL Language 5"—I think we were kind of embarrassed by the name SNOBOL, which was originally

intended to be a joke and then caught up with us. At some point we realized that we had a conceptual breakthrough in the area of programming-language facilities and we set SL/5 aside and started working on a new linguistic context that became Icon.

Icon looks a lot like SNOBOL4 in some respects, but it looks very different in others. I use both of them indiscriminately, although I prefer Icon. I've taught both of them; I prefer to teach Icon because some of the things in SNOBOL4 date back to a time when our ideas about programming were very different from what they are now, and it's kind of embarrassing. Fun, but embarrassing.

In one sense Icon can be looked at as just what you were talking about, an attempt to keep the good features of SNOBOL4 and replace the bad ones with better ones. It's not an entirely accurate characterization, but it's one way of looking at it.

BYTE: What do you see as some of the special features of Icon?

Griswold: In the first place, it carries some of the features of SNOBOL4 that were attractive to begin with—attractive for certain kinds of uses, for certain kinds of people. It tries to make programming easy, at the possible expense of efficiency. It tends to support the programmer. It's also good for one-shot programs. You can write an easy program that's quick and dirty—use it once and throw it away—very much like SNOBOL4.

The thing that's most intellectually interesting about it and most potentially significant in its influence on programming languages of the future is that expressions can have more than one value. This is a carryover from SNOBOL4 string pattern matching where patterns could first match one thing and then match another.

What motivated Icon really was the recognition that this didn't have to be limited to pattern matching; it could be a general feature of programming, not just string processing. Expressions in Icon are capable of producing a sequence of results. This works

(continued)

# Stamford

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*'SNOBOL lets  
people write  
really simple, compact,  
natural code  
instead of crazy loops,  
nested things,  
and so forth.'*

just as well in numerical domains and list processing as in string processing. It makes very simple and natural some kinds of formulations that are contorted and difficult in other languages.

Expressions may produce an infinite number of results. In that sense, Icon is a superset of ALGOL-like languages where you evaluate one expression and you get one result, period, no matter what. In Icon you may get zero results, which corresponds to failure in SNOBOL4; you may get one, which corresponds to normal computation; or you may get a lot of results if the surrounding context needs them to arrive at a solution. There's a flavor of logic programming in Icon; you can see logic programming as a subset of it. There's logical conjunction and disjunction. It all fits into a uniform theoretical

framework that the programmer may never have to see but which has the nice feature that you can see generalizations.

This is what turns people on; they can find new ways of expressing things they couldn't have before. You can iterate overall solutions. There are several programming languages that have iterators, going back to IPL-V, and more recently Alphard, CLU, and SETL, but they're all limited to specific kinds of structures or contexts over all the elements of a set. In Icon you can just have a lot of expressions that produce a lot of results and you can iterate the results overall. You can produce sequences; you can manipulate sequences. Those were all inherent in SNOBOL4 but they were limited to a very small context, and the programmer couldn't get his or her hands on them. Now it's been generalized, and that is what I think is going to appeal to people.

That, I think, is the most significant thing. In fact, it surprised us; we didn't expect that to be the result. That's what really excites people; they can write really simple, compact, natural code instead of all these crazy loops and nested things and so forth. It looks like it ought to look and it produces the results it ought to produce.

Icon produces interesting programs, and it's fun—which can't be knocked. Programmers are, after all, human beings.

BYTE: What Icon implementations are out

there right now?

Griswold: There are several versions. The one that is current, and maintained and supported, is version 5, which is the UNIX-based system. It's written mostly in C. It's available on PDP-11s, VAX-11s, Sun workstations, AT&T 3B20s, Onyx. . . . We have it running on PC/IX now—it's not ready for release, but the full language is running. And there's a VAX VMS implementation. There are 80 or 90 VMS systems out that we know of, most of those in educational environments.

There are probably two dozen implementations of Icon for various kinds of processors in progress, but what will become of them I don't know.

We've decided to go with C as an implementation language and UNIX as an environment. It's not easy to implement this in assembly language. Implementing Icon from the start is considered to be a research project. How you implement the expression-evaluation mechanism efficiently is not something that's obvious. It's incompatible with stack-based implementations of languages like ALGOL-68 or Pascal. So again, the implementations come from a generic one, and that limits its availability.

BYTE: Do you see a specific group of people using Icon?

Griswold: There is an academic group again. It's being taught in comparative

(continued)

## AUTHORS!

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programming languages as a replacement for SNOBOL4 here at the University of Arizona, and at Carnegie-Mellon, Illinois Institute of Technology, Duke, and a few other places. That's probably because Icon is more cosmetic from a computer science point of view, even if you think of it as SNOBOL4 embedded in Pascal, which it isn't, but even if you think of it that way.

People in industry are using Icon for VLSI [very large scale integration] layout. They're using it for utility programming; we have quite a few utilities written in it here. It's good for all kinds of things, from producing nicely centered labels for mailing lists to random-sentence generators, linguistic analysis, all those unusual things that other languages don't do well. It fits into the humanities very nicely; we're getting a lot of people really looking at Icon in the humanities now. Icon tends to be a catchall like SNOBOL4 for all those applications that other languages are not designed for.

It's still fairly young; SNOBOL started in 1962 and SNOBOL4 came out in 1968. Icon wasn't available to anybody outside the University of Arizona until about 1978 or 1979, and the current version, the UNIX version, is quite a bit more recent than that.

I don't think Icon will develop an

identifiable user community. I think it will be a tool that some people use by preference or other people use for special purposes.

BYTE: *Why the name "Icon"?*

Griswold: No reason. You need a name when you want to talk about something.

One of my colleagues was into one-character names at the time, C being the current attraction, but there were languages called A and B before C. He wanted to call the language S, because it's short. Well, that doesn't look very good when you're writing—it looks like you've made a typo. C is bad enough and S is worse.

So we sat around for a long time trying to think up names. I personally am not very enthusiastic about acronyms or naming languages after famous or infamous people, but you need a name.

I'm responsible for the name. You can find some thread, in the sense that the language development of which it's a by-product has been rather iconoclastic. But that's not why we picked the name; it's just an excuse I can give you for it.

In hindsight, I think the unfortunate thing is that it's caused some confusion because of the use of the word "icon" to mean a symbol in programming systems—the Lisa and so forth—

which came after Icon was developed and published. Every so often we get a request for Icon because somebody thinks he's going to get some kind of screen-manipulation package. But we couldn't have anticipated that, I don't suppose.

We chose not to call it SNOBOL6 because that sounds like it's just another revision, and it's so substantially different. It's as different as PL/I is from FORTRAN.

It's a problem, picking names. You pick a name and later on you wish you hadn't.

BYTE: *Where do you think microcomputers are taking us?*

Griswold: I've been in computing for about 25 years. When I first got into it I thought, "Gee, wouldn't it be great if I could have my own computer! But what happens when I retire because the machine is an IBM 360/50 and costs a million dollars and it's as big as this room?" One of my colleagues said that was his ambition—to have a 360 in his basement. Now, of course, I run UNIX on an IBM PC XT and have at my fingertips essentially the kind of computation that used to be too expensive for even a whole organization to own, at a price I can afford. And I don't think we fully understand what the impact of that is going to be.

BYTE: *In the next few years, we'll be seeing microprocessors that can address gigabytes of memory. There are very few languages or programming concepts out there now that can't be done in that kind of space.*

Griswold: Someone will invent one. Someone *always* invents one. Given that amount of space, they'll find a reason. ■

FOR FURTHER INFORMATION

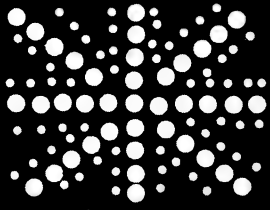
Griswold, R. E., J. F. Poage, and I. P. Polonsky. *The SNOBOL4 Programming Language*, 2nd ed. Englewood Cliffs, NJ: Prentice-Hall, 1971.

Griswold, M. T., and R. E. Griswold. *The Icon Programming Language*. Englewood Cliffs, NJ: Prentice-Hall, 1983.

For information on Icon, contact the Icon Project, Department of Computer Science, University of Arizona, Tucson, AZ 85721.

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# Starlit Spectrum

Using the  
Sinclair  
Spectrum to  
collect and  
process  
astronomical  
data

BY DICK POUNTAIN

**T**he subject of this month's column is the prominent U.K. amateur astronomer Andrew J. Hollis. He uses a low-cost Sinclair Spectrum microcomputer to perform data capture and processing on observations obtained by photoelectronic photometry (the electronic measurement of the brightness of celestial objects).

Mr. Hollis, who is a chartered engineer by profession, runs the Ormada Observatory from the garden of his house in the northern England country village of Cuddington in Cheshire.

He became interested in astronomy in 1957 when his parents showed him the comet Arend-Roland through a pair of opera glasses; from this beginning he went on to join the British Astronomical Association (B.A.A.) and build his own 8-inch reflector telescope in the late 1960s. Though his interest in astronomy is broad, he is particularly interested in variable stars and in the asteroids (more properly called the *minor planets*) and is now director of the minor planets section of the B.A.A.

No science (with the possible exception of ornithology) is as open to contributions by "amateurs" as astronomy. Indeed, the term "amateur," which has acquired faintly derogatory overtones in this century, seems barely adequate to describe their efforts. There is certainly nothing "amateurish" about the activities at Ormada Observatory. Therefore, I shall intend the term in its original sense of one who works for love of the subject. The results obtained by Mr. Hollis and his coamateurs are often significant enough to be published in the B.A.A. and other astronomical journals.

The advantage of a large telescope is that it collects more light, hence it can measure fainter objects that smaller telescopes can't detect. Since the giant telescopes are almost always dedicated to the inspection of the most remote objects beyond our galaxy, it's not uncommon for professional astronomers to actively solicit the participation of serious amateurs when an event of

interest like an eclipse occurs in this solar system. The combined small telescopes of amateur observers around the world add up to a formidable instrument.

Time on the large telescopes at major observatories must be booked many months in advance and is tightly rationed. An observer whose allocated slot comes up is then at the mercy of the weather; if conditions are bad, the whole session may be fruitless. Consequently, a professional observer who wishes to study a particular variable star or minor planet may get only 16 or so hours of observation a year. Hollis reckons that he can get in at least 50 hours per year because he is in a position to observe from his garden observatory any time the weather is fit.

## PHOTOELECTRONIC PHOTOMETRY

The study of both variable stars and asteroids depends in part upon measuring their brightness. In the case of a variable star, the aim is to chart the changes in brightness over time. The shape of the light curve so produced can help to answer several questions about the star system that produced the stars: Is it a binary or ternary system of stars orbiting each other? What are their relative sizes? Do they have extensive atmospheres? Are they exchanging matter?

Andrew Hollis spends much time measuring such light curves to derive the times of minima (those points in a star's cycle when the brightness is at its lowest level). He acquires further information by taking accurate measurements of the period of variable stars, i.e., the time between minima. If this is done to sufficient precision, long-term fluctuations can be distinguished, as some stars appear to slow down or speed up over years or decades. Mr. Hollis also measures the brightness of asteroids and plots this against their progress in orbit around the sun. These measurements yield details about their shape and orientation.

(continued)

Dick Pountain is a technical author and software consultant living in London, England. He can be contacted c/o BYTE, POB 372, Hancock, NH 03449.



Before the advent of electronics, brightness was estimated visually using the magnitude system. Certain important groups of stars were classified into groups of similar brightness, and these groups were then ranked in magnitudes—first magnitude being brightest and so on in order of decreasing brightness down to the limits of visual discrimination at the sixth magnitude.

To estimate the brightness of an object visually, you use a star map to identify a nearby star of known magnitude, compare the object with it, and decide whether the object is more or less bright in the telescope than the nearby star. Choose another known star and repeat. By making numerous comparisons of this sort you can assign a magnitude to the object, interpolating if necessary between the two nearest known values. Though it may sound rough, skilled observers can in fact produce remarkably accurate estimates this way. However, it lacks the degree of precision necessary to follow fine variations in variable stars.

Photoelectric photometry re-

places this visual ranking method with a direct measurement of the light entering the telescope from the object. (To accommodate this, the magnitude system has been refined into a more quantitative logarithmic scale that permits fractional magnitudes extending down to the 20th magnitude and below.)

Some kind of photoelectric detector is placed at the prime focus of a telescope so that the image of the star falls on it. The current or voltage produced by the detector must be in some way proportional to the amount of light falling on it. The telescope is not used to magnify the image of stars, as we do with terrestrial images, but merely as a light collector.

The telescope collects light from a more or less large region of sky (determined by its aperture), not merely from the desired star. To narrow this field to the object of interest, a diaphragm plate with a tiny hole in it is placed at the focus and the star image is positioned (by eye) over this hole, thus excluding surrounding stars. A further refinement is to take a second light reading with the telescope

focused on a region of empty space. This reading can be subtracted from the first to eliminate the residual effect of background light and the spurious dark current produced by most detectors.

Photodetectors typically respond to a broad band of wavelengths in the starlight. Astronomers are interested in certain wavebands and so will usually interpose filters between telescope and detector, allowing only certain bands to pass. Hollis works in three widely studied bands known as the UB<sub>V</sub>, for ultraviolet, blue, visual.

Readings taken straight from the photodetector bear a most indirect relation to the magnitude of the star, and it is here that a computer can be used to make the necessary conversions.

### THE HOLLIS SYSTEM

At the time of my visit to Ormada in February, Andrew Hollis's own 300-millimeter telescope was away being rebuilt, and his photometry system was mounted on a borrowed 135-millimeter telescope (it sits on a German equatorial mounting, powered by a synchronous electric motor from a home-built power supply).

At the heart of the system is a side-window photomultiplier tube (RCA 1P21) that does the actual detecting—it looks like those vacuum tubes used in old radios. Photo 1 shows the detector mounted in its enclosure on the telescope—the eyepiece and flip-up mirror allow visual positioning of the star image onto the diaphragm plate.

Inside the evacuated glass envelope of the photomultiplier tube are nine metal anode chambers. At one side is a window through which light passes and falls onto a photocathode, dislodging a few electrons.

A DC voltage of around 1000 volts accelerates these electrons to the first anode. On striking the anode, each electron dislodges more electrons, which accelerate to the second anode, etc. This snowballing effect results in a huge amplification, with around 1 million electrons arriving at

(continued)

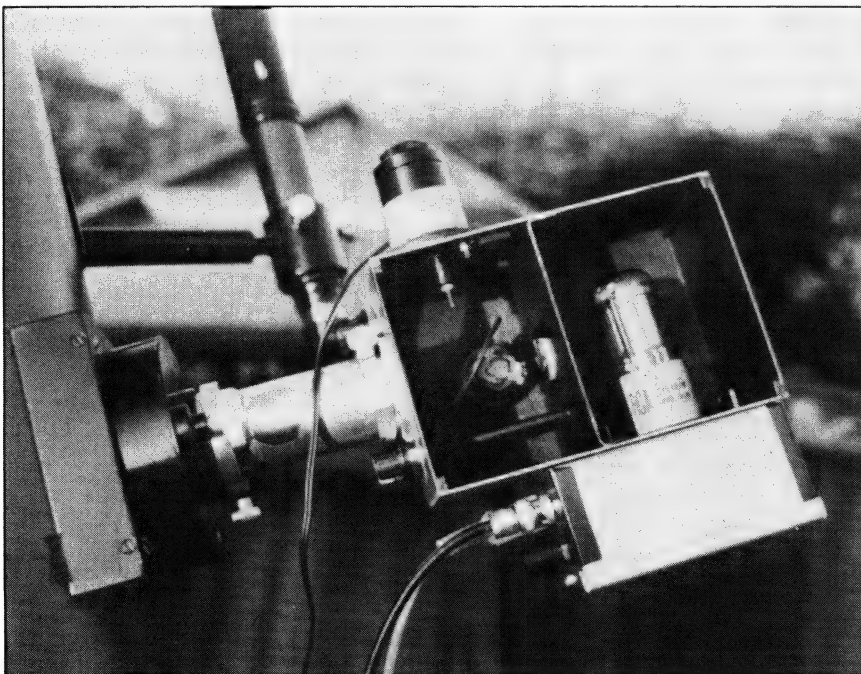


Photo 1: The photodetector subsystem attached to the telescope has a flip-up mirror in the left-hand compartment that directs light to the eyepiece on top.



## *The interface program is written to use interactive printer output, much like the old days of the Teletype.*

the final anode for every electron initially dislodged by a photon.

The end result is a tiny burst of current, measured in nanoamps or even picoamps, proportional to the original amount of light. To increase efficiency, the star image is actually defocused by a lens after passing through the diaphragm aperture, so that it covers more of the photocathode; only the total amount of light is important, not the image itself.

The processing of this tiny signal begins immediately when it is passed to a high-gain current-to-voltage amplifier. (Hollis uses an Intersil ICL7650 chopper stabilized op-amp on a single chip.) The output is now a DC voltage in the range of 0-10 volts. However, it varies during each observation, and reading it directly would involve messy averaging calculations. Consequently, Hollis passes this signal to another chip, a Teledyne 9400CJ voltage-to-frequency converter, which outputs either a stream of pulses or a continuous square wave whose frequency is proportional to the input voltage.

This can now be sent to a pulse counter and the count read off from a calculator-style visual display. By recording for a fixed period of time, the number of pulses counted will be a measure of the light received integrated over that period.

Hollis finished his basic system in 1983 and began recording observations manually from the pulse-counter display. Each observation requires at least three readings: two from the star (which are averaged) and one from the background sky (to be subtracted). Sometimes readings must be

repeated because some stray event lights up the sky and causes a bad reading.

To obtain standard star magnitudes, these readings must be performed on both the object of interest and a comparison star of known magnitude. Then these two readings need to be reduced using various mathematical formulas to convert them from instrumental magnitude to the Standard UB<sub>V</sub> Magnitude. One formula calculates the differential air mass (i.e., the distance the light had to travel through the earth's atmosphere) according to the stars' heights above the horizon, another corrects for instrumental scale factors, while others convert from geocentric to heliocentric time.

Finally, subtracting these results yields the differential magnitude of the object of interest; a long, timed series of such differential magnitudes is required to show the variation in brightness, and thence the time of minimum.

### **COMPUTERIZED DATA ACQUISITION**

It quickly occurred to Hollis that this whole rigmarole, including the initial capture of data from the instrument, could be performed by a microcomputer with considerable savings of effort and increase of reliability. He selected the Sinclair Spectrum because of its low cost, availability, and its large volume of add-on circuitry published in the electronics hobby press.

The Spectrum, Britain's largest selling computer, was sold for some time in the U.S. (in a slightly modified form as the Timex 2000). For those who are not familiar with it, it's a Z80-based machine with 48K bytes of RAM (random-access read/write memory) and a highly individual BASIC in ROM (read-only memory). It is supplied with no standard I/O (input/output) ports (e.g., RS-232C or Centronics) but has a parallel expansion socket, using a proprietary bus, and cassette port. Internally it is a low chip-count design, with all the peripheral activities controlled by a single ULA (uncommitted

logic array, or gate array as it is commonly called in the U.S.).

Hollis built his own interface box to fit onto the bus-expansion connector. This contains the high-gain amp and voltage-to-frequency converter chips and a Z80A-PIO (parallel I/O) chip.

Instead of taking the pulse output from the voltage-to-frequency converter to a counter, the alternative square-wave output is taken to the first data pin of the PIO. The PIO is configured in mode 3, or control mode, with no handshaking. The net effect is that the central processing unit sees the first bit of an 8-bit port toggling on and off at the frequency of the square-wave signal.

Hollis realized that Sinclair BASIC would be too slow to read this port—a sampling rate of at least 6500 reads per second is required. He wrote a short machine-code subroutine that counts the number of changes of state of the single bit that is input over a variable integration period, typically 10 seconds, and returns the answer in the Z80's BC register to the main interface program, written in BASIC.

Hollis doesn't like to take a television set out into the confined and often damp environment of the observatory, and so the interface program is written to use interactive printer output, much like the old days of the Teletype. Data can be inspected immediately on the Sinclair printer, a tiny low-cost device that prints electrostatically on rolls of 4-inch metalized paper and takes its power from the Spectrum. Any reading that is clearly wrong can be deleted and taken again. Satisfactory readings can then be stored on cassette tape for further processing by other programs.

To further simplify the business of gathering data, Hollis has built a remote-control unit to operate the Spectrum. This is made from an off-the-shelf 5-key cursor keypad mounted in an alloy box and connected by a long lead to another interface box on the bus-expansion port. It allows Hollis to take readings without leaving the telescope.

After an observing session the

*(continued)*



Spectrum is taken back indoors and the results are reduced by a second program that applies all the various corrections, converts the date and time to the required Julian calendar, and finally prints out the time of minimum of the variable star under study, together with statistical certainty estimates. This program works on a TV screen as well as the printer.

A third program is used to predict the time of minima. This contains a database of the periods of 67 selected variable stars, gleaned from the *General Catalog of Variable Stars*. It calculates and prints out a list of the times of all the minima for a given night, allowing Hollis to plan his evening viewing efficiently.

A home-brewed graphing program for the diminutive Sinclair printer produces neat and highly presentable scatter graphs of light curves. Figure 1 shows a typical light curve for the asteroid VW Cephei.

### TIMING MATTERS

The Spectrum has proved itself highly competent and cost-effective for the sort of work that Hollis requires. Its main limitations are the lack of double-precision floating-point arithmetic and a real-time clock. The relatively slow BASIC and cassette

storage are no problem and are only noticeable in the Minima Prediction program.

Precision is not too serious a matter as the 10 significant figures of the Spectrum's BASIC are well beyond the inherent accuracy of the photometer readings. The only problem involves the representation of Julian dates, in which the time and date are combined to give the time in fractional days since noon on January 1 of the year 4713 B.C. These numbers have seven figures before the point and up to six places after it, if you're measuring to fractions of a second (I'm writing this word at approximately 2446123.57540). Hollis gets around this by dropping the initial 24 in internal calculations, which is unlikely to cause any problems for a century or two.

Timing is a more serious problem. The Spectrum uses interrupts for its I/O, causing the software clock to stop during printing and cassette operations. At first, Hollis tried timing the printing operations and adding a correction factor, but he was soon looking for a proper real-time clock.

He found a suitable design published in an electronics magazine and built it. It has battery backup and is based on an MM 58174 clock chip

with its own 2K-byte static RAM into which the Spectrum can write key parameters such as the latitude and longitude of the observatory and the year (which the chip's designers inexplicably left out). This clock card stacks onto the bus-expansion connector at the back of the Spectrum, making quite a pile of hardware.

There is a scheme afoot, however, to provide even more precise timing. Hollis intends to move into new areas of observation, including studying the orbits of Jupiter's moons and the occultation (i.e., hiding) of stars by asteroids. This requires high-speed photometry using the highest possible sampling rate.

For a slowly changing variable star, integration of the light received over a 10-second period is satisfactory, but to resolve detail in the occultations occurring over a few seconds, the light needs to be sampled at subsecond intervals.

To time such observations, Hollis has built a radio receiver that can pick up a time signal called MSF, broadcast on 60 Hz from Rugby in the Midlands. Fortunately, there's no need to synchronize the readings with the transmitter (which would be a major programming problem); it is sufficient to merely record the time "pips" alongside the data like the time base on an oscilloscope.

### LIGHT DETECTORS

There is now a small community of astronomers like Andrew Hollis using the comparatively cheap side-window photomultiplier tube as a light detector. By experimenting and exchanging their findings they have extended the limits of its performance in quite unexpected ways.

One drawback of the device is its comparatively large and variable dark current (i.e., the signal produced even when no light is falling on it). Hollis and confederates have discovered that this dark current can be drastically reduced and made more constant, not by cooling as is often done with photodetectors, but by drying the environment in which it operates.

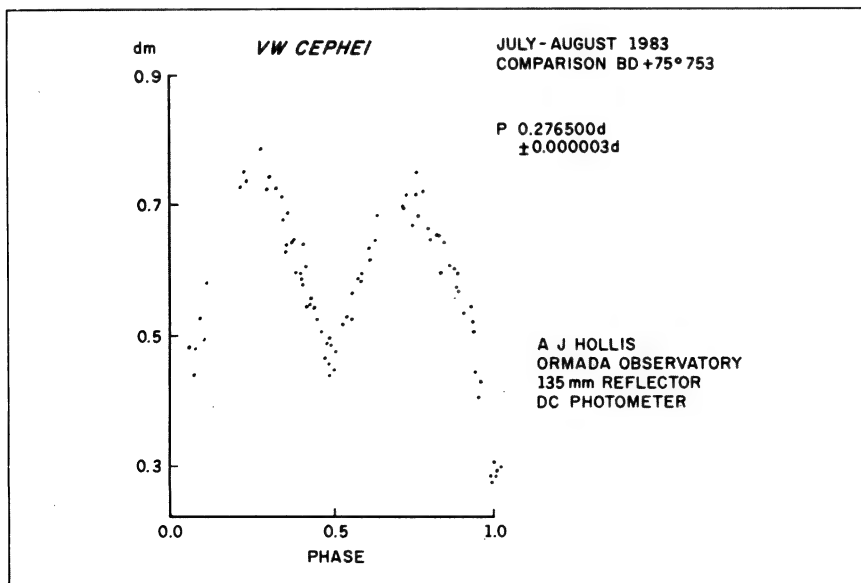
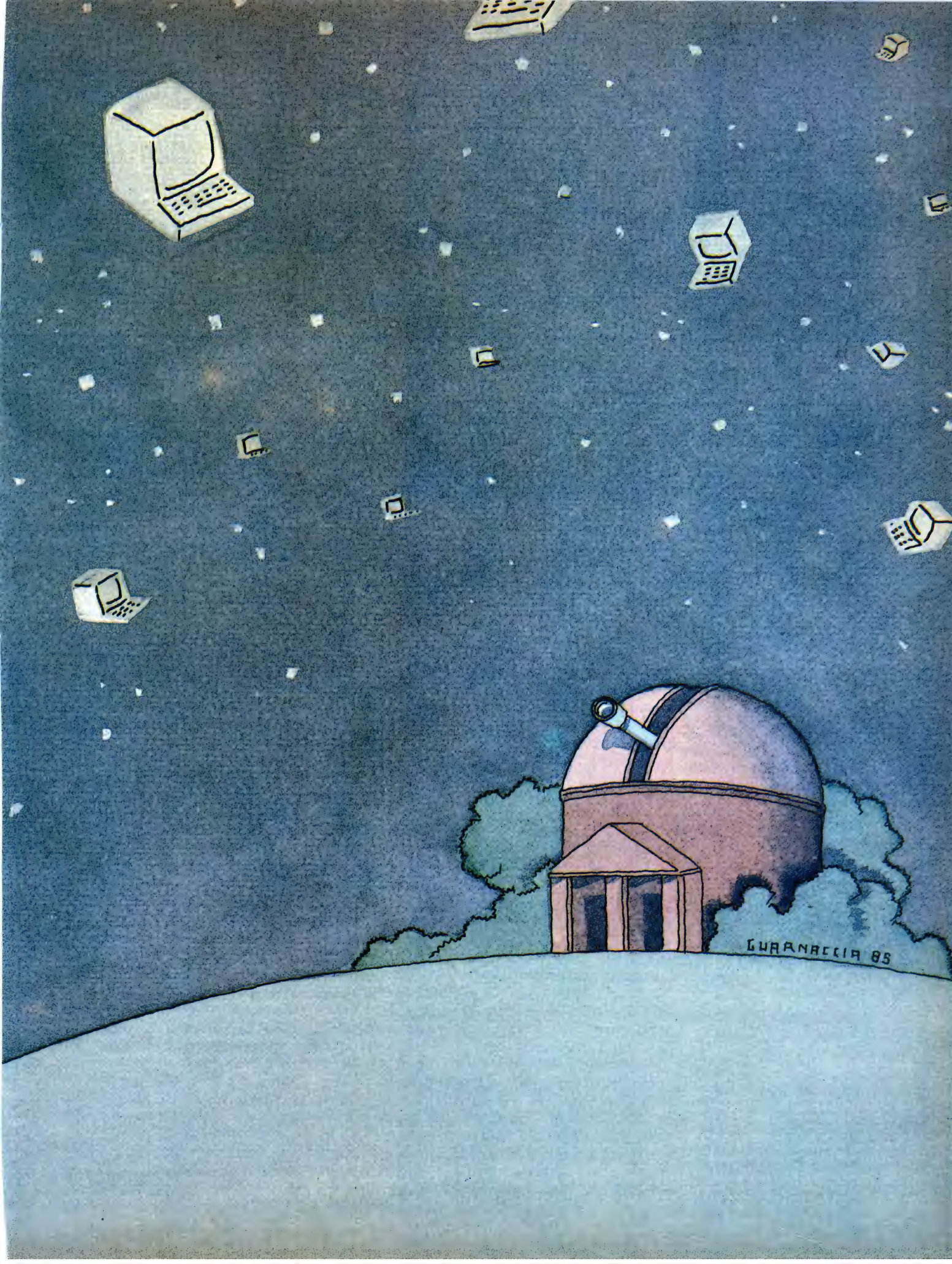


Figure 1: A typical light curve for the asteroid VW Cephei.

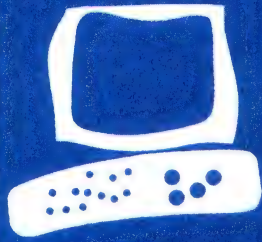
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GUARNACCIA 85





## S·Y·S·T·E·M R·E·V·I·E·W

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# NCR Personal Computer Model 4

**A sturdy  
IBM PC-  
compatible**

BY ELAINE HOLDEN

**T**he NCR Personal Computer Model 4 is definitely not a portable—it weighs 50 pounds and measures 18 inches wide and almost 15 inches high (see photo 1). But you couldn't find a more rugged computer. And NCR dealers provide dependable service. (Each dealer has a technician trained to handle any repairs. If you're not near a dealer, you can use NCR's mail-in service.)

The NCR computer comes in six variations. Choices include monochrome or color screen, one or two double-sided double-density floppy-disk drives, or a half-height 10-megabyte Winchester drive in place of the second drive.

It is a pleasure to find the on/off switch and the volume and brightness controls located on the front of the unit. The quality of sound is excellent.

### SOFTWARE

Like all other IBM Personal Computer (PC) clones, the NCR Personal Computer cannot have BASIC in ROM (read-only memory) as it is in the IBM PC. In order not to violate copyright restrictions, an IBM PC-compatible BASIC must be on a floppy disk. The NCR version of GW-BASIC is easy to use, and the documentation provides excellent support. But the need to have BASIC on a disk almost necessitates the use of two drives; constantly switching disks can be annoying.

I was impressed by the exceptional compatibility of the NCR with the IBM PC. I was able to run Lotus 1-2-3, the Leading Edge word processor, and other packages for the IBM without any problems.

The software that comes with the NCR computer includes self-teaching programs: NCR Tutor, NCR Pal, and an on-disk help facility, NCR Help. I found these programs to be well designed. The disks provide examples of spreadsheets, word processing, games such as blackjack (I'm into the machine for five grand), program-development software (editors, compilers, etc.), and

system software (operating systems, run-time interpreters, and utilities). NCR-DOS 2.11, part of the same package, boots easily and is operationally compatible with MS-DOS and PC-DOS systems found on other personal computers. A good feature for novice users is the control placed on the master disk. NCR has designed it to be copied only and not ever used. Once you make the copy, you store the original master and use the copy. This is excellent insurance against accidental loss of the master disk and also gets the user comfortable with making backup copies.

### RAM DISK

Another interesting piece of software provided by NCR is the RAM (random-access read/write memory) disk utility. While not to be confused with a plug-in card with lots of memory and the software to use the memory as a disk, this program is an attempt to use internal memory for the same function. Basically, the RAM-disk utility lets you partition the RAM and use part of it for information or programs normally stored on the floppy disk. The information or the program is kept completely in internal memory and can thus speed the functioning of the computer because it has to reference only the information held in RAM rather than go to the external floppy. It is like having a third, very fast, disk drive.

Other microcomputers have lacked this convenience, and it does increase the speed considerably. And when using a word processor, the machine processes directly through the RAM disk and saves time by not referring constantly to the floppy disk for program instructions. The only drawback I see is the need for a large amount of memory to begin with. In order to fully utilize this feature, you would need almost all the memory NCR has to offer.

If you have less than maximum memory in your Model 4, you will have to take my or the company's word for the feature since the RAM Disk Demo does not perform well

Elaine Holden (22 Elm St., Peterborough, NH 03458), formerly an assistant professor of computer science, is doing advanced graduate work at the University of Lowell.



with less memory. The example included with the documentation clocks the time it takes to run a multiplication table with and without the RAM disk. Nice benchmark test—only they both took the same amount of time (11 seconds): no difference noted with only the 128K bytes or up to 256K bytes of memory.

### DISPLAY

I found the monochrome display to have excellent resolution, competitive with any on the market. The green-phosphor screen has an 80-character by 25-line display. All characters are clear and easily read. I was equally impressed with the clarity of the color display. This 16-color screen also has a display of 80 by 25 and 640 by 200 pixels.

### KEYBOARD

Weighing in at 4½ pounds, the keyboard tilts forward or lies flat (see photo 2). NCR sells the keyboard separately. It's plug-compatible with the IBM PC and the Compaq Deskpro. The keyboard connection is easily accessible at the back of the unit. Layout is compatible with the IBM PC, but NCR designers have added a separate cursor-control pad as well as separate Control, Page Up, Page Down, Delete, End, and Insert keys to the numeric keypad. I found this convenient because I could control functions in word processing while the numeric keypad was still on. Business users will find this a most important feature when jumping from one application to another.

LED (light-emitting diode) indicators on the Caps Lock and Num Lock keys are also an improvement over the standard IBM keyboard. They are not distracting but serve as gentle reminders.

### PROCESSOR BOARD

The NCR Model 4 is controlled by an Intel 8088 microprocessor. This unit functioned well through all the benchmarks.

Standard for the NCR is 128K bytes of RAM, expandable to 640K bytes. Expan-

sion from 128K bytes to 256K bytes is accomplished by adding extra chips to the main board in increments of 64K bytes. This board is located behind the adapter boards. To add memory, you remove the back of the machine and all of the boards and insert the chips one at a time. If your fingers have been genetically programmed to resemble needle-nose pliers, you won't have any problem. However, I suspect the workspace may be cramped for the larger-handed members of our species.

Another step in the process calls for the resetting of toggle switches located at the very top of the main board. I did not have a problem with this task, but I suspect that a novice user might, especially since the documentation is insufficient here. NCR should provide a clearer explanation and a set of diagrams.

(continued)



Photo 1: The NCR Model 4 with two vertical disk drives.



## Letter to the Editor

Dear Sir,

In Australia, instead of the dealers providing their own service, NCR provides a network of field service engineering offices throughout Australia, both in metropolitan and country centres. Their NCR PC is sold standard with dual drives, 256K RAM and seven IBM PC compatible slots.

One important feature of all color display monitors sold with the NCR PC in Australia is 640 x 400 pixels standard.

The NCR PCs sold in Australia are manufactured in West Germany.

The prices, including sales tax, of the NCR PC4i are A\$4,050 for a 256 KB, mono screen and dual drives.

A\$4,500 for a 256 KB color screen (640 x 400 pixels) and dual drives.

A\$6,300 for a 256 KB mono screen, one floppy drive and one x 10 MB hard disk.

A\$6,800 for a 256 KB colour monitor, 1 floppy and one x 10 MB hard disk.

PETER KLANBERCH  
Managing Director  
Logo Computer Centre  
305 Henry Lawson Business  
Centre,  
Drummoyne, N.S.W.

## FOR COMPUTER SHOPS

If you wish to sell JUST COMPUTERS retail, on consignment, through your shop, either in New Zealand or in Australia, please forward your name and address (printed, but with your signature as well) to our New Zealand or Australian address, indicating the number of copies of your monthly order.

**JUST**  
COMPUTERS

You can further expand the system to the full 640K bytes of RAM by inserting a 384K-byte memory board. But if you want extra memory by using the memory board, the 128K-byte expansion chips must first be in place. Once again you have to reset the toggle switches and then replace the boards.

This unit has five third-party-compatible expansion slots and three ports: keyboard, integrated RS-232C asynchronous interface, and a Centronics parallel interface for the printer.

### DISK DRIVES

The NCR Personal Computer is available with one or two 360K-byte double-sided double-density floppy-disk drives. An optional 10-megabyte Winchester drive can also be added in place of one of the floppy-disk drives, an obvious advantage for business users who demand extensive external storage. The 5¼-inch TEAC drives are positioned vertically to the right of the screen. This makes disk exchange very convenient. Initially, though, these drives seemed noisier than those on any of my other computers.

Maybe the positioning of the drives is to blame, though vertical positioning should not be a factor in more noise or vibration. Engineering of

either horizontal or vertical disk drives provides for proper bearing placement and counterbalancing of the read/write head, which would preclude any extra noise.

Rather than condemn vertical drives in general, I would rather say these particular drives are noisier. This may be related to the choice of manufacturer; some companies *do* make noisier drives, particularly if they use metal drive bands. When I dismantled the computer I noted that the drives' magnetic-head carriage is moved along the guide shafts by a motor controlled by a steel belt. The drives are secured to a metal housing by three screws (two on the top and one on the bottom), and they rest on a metal plate that may act inadvertently as a sound board. Future engineering changes should deal with the source of the extra vibration and perhaps eliminate the sound board or cushion the assembly with a gasket to absorb more of the vibration encountered by the drive movement.

### DOCUMENTATION

The documentation for the Model 4 is, for the most part, excellent. Since setup is not complicated, a first-time user will feel at once comfortable and in control. The manuals are accurate, and they provide material ranging

(continued)

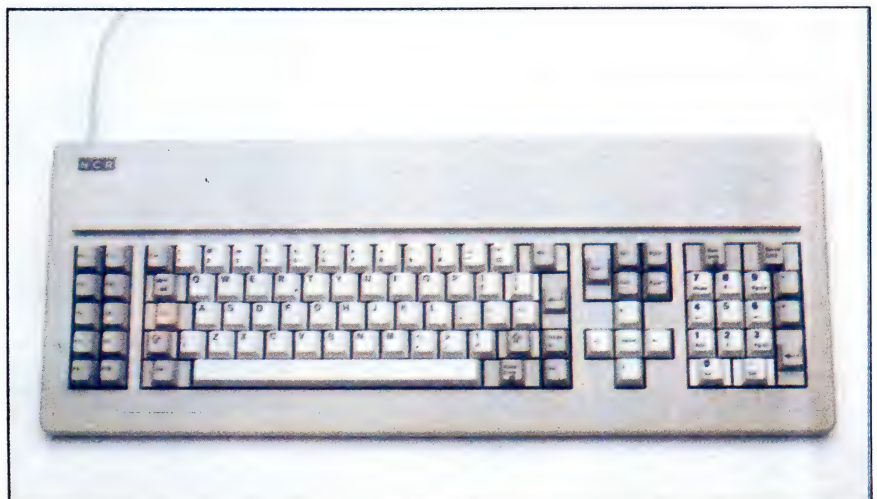


Photo 2: The keyboard, sold separately by NCR, is plug-compatible with the IBM PC and the Compaq Deskpro.



## AT A GLANCE

### Name

NCR Personal Computer

### Manufacturer

NCR Corporation  
1700 South Patterson Blvd.  
Dayton, OH 45479  
(513) 445-5000

### Size

14.8 by 14.6 by 18 inches;  
50 pounds

### Components

**Processor:** Intel 8088,  
4.77 MHz

**Memory:** 128K system  
memory, expandable to 256K;  
board expansion to 640K

**Mass storage:** One or two  
360K double-sided double-  
density 5¼-inch TEAC floppy-  
disk drives; optional half-  
height 10-megabyte

Winchester hard-disk drive or  
dual 8-inch flexible-disk drives  
**Display:** 80 characters by 25  
lines, monochrome green  
(optional color), 640 by 200  
pixels

**Keyboard:** IBM PC-  
compatible, plus separate  
cursor-control pad

**Expansion:** Three IBM PC-  
compatible slots available in  
dual-disk system

**I/O interfaces:** RS-232C port,  
parallel printer port

### Software

GW-BASIC, NCR-DOS 2.11,  
NCR Tutor, NCR Pal, NCR  
Help, diagnostics

### Documentation

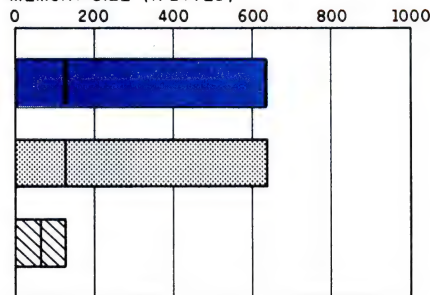
Owner's manual, GW-BASIC  
manual, NCR-DOS manual

### Price

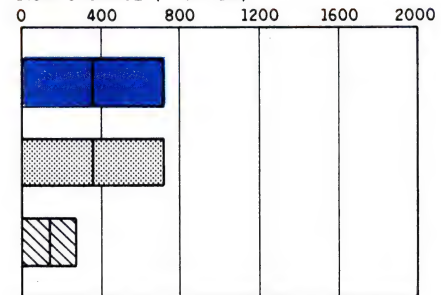
Monochrome screen, one  
drive, and 128K RAM, \$2400;  
second drive, \$425;  
64K RAM, \$90;  
128K RAM, \$180;  
parallel or serial  
printer cable, \$45;  
10-megabyte hard disk, \$2195



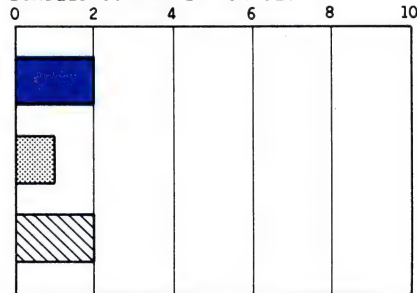
MEMORY SIZE (K BYTES)



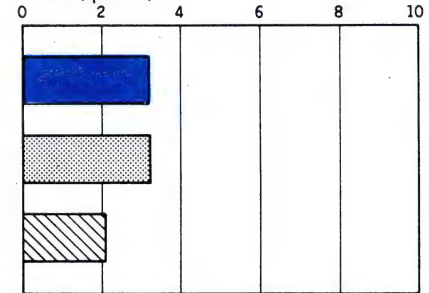
DISK STORAGE (K BYTES)



BUNDLED SOFTWARE PACKAGES



PRICE (\$ 1000)

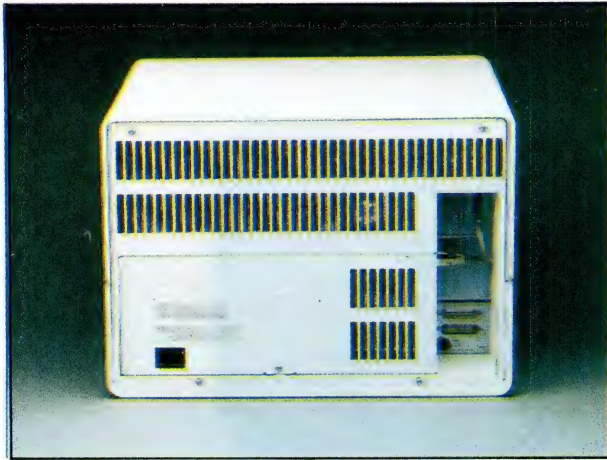


■ NCR PC    ■ IBM PC    ■ APPLE II E

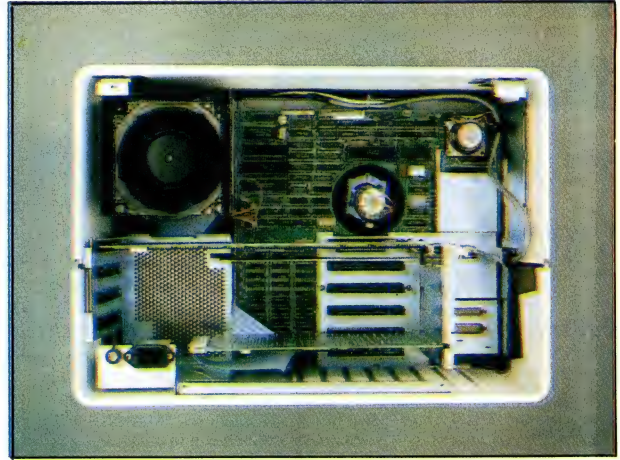
The Memory Size graph shows the standard and optional memory for the computers under comparison. The Disk Storage graph shows the highest capacity of one and two floppy-disk drives for each system. The Bundled Software Packages graph shows the number of packages included with each system. The Price

graph shows the list price of a system with two high-capacity floppy-disk drives, a monochrome monitor, graphics and color-display capability, a printer port and a serial port, 256K bytes of memory (64K for 8-bit systems), the standard operating system for the computers, and their standard BASIC interpreters.



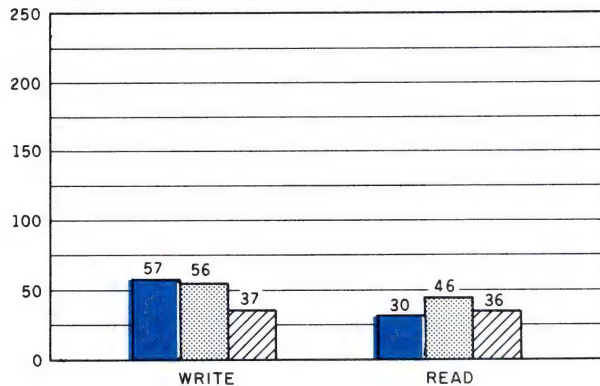


The rear of the NCR PC Model 4. The power supply is at left, the RS-232C and parallel ports are at right.

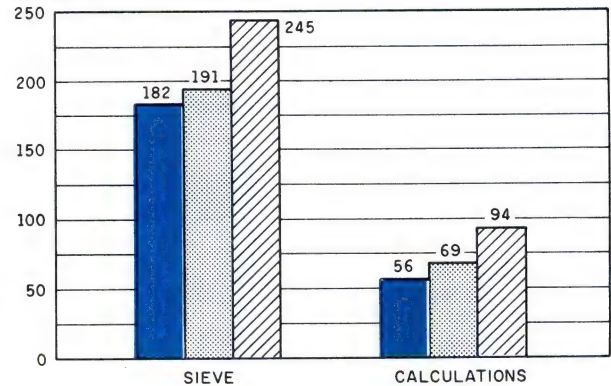


Inside the Model 4. The main CPU board is visible behind the expansion slots.

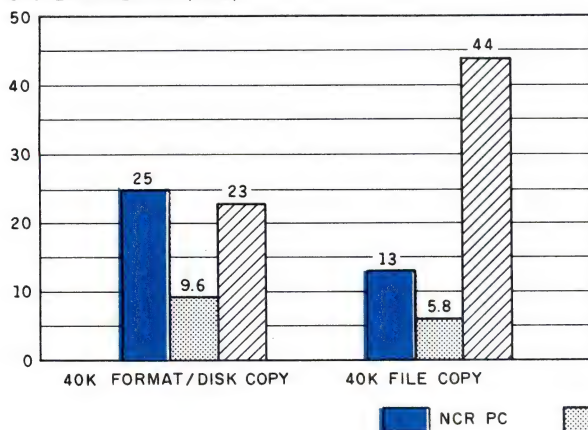
DISK ACCESS IN BASIC (SEC)



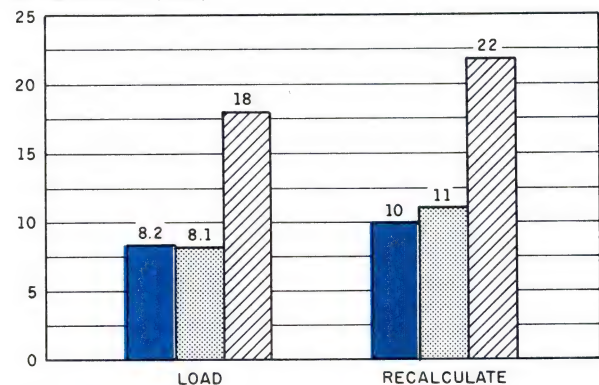
BASIC PERFORMANCE (SEC)



SYSTEM UTILITIES (SEC)



SPREADSHEET (SEC)



In the Disk Access in BASIC graph, a 64K-byte sequential text file was written to a blank floppy disk and then read. (For the program listings, see June 1984 BYTE, page 327, and October 1984, page 33.) In the BASIC Performance graph, the Sieve column shows how long it takes to run one iteration of the Sieve of Eratosthenes. The Calculations column shows how long it takes to do 10,000 multiplication and 10,000 division operations using single-precision numbers. The System Utilities graph shows how long it takes to format and

copy a disk (adjusted time for 40K bytes of disk data) and to transfer a 40K-byte file using the system utilities. The Spreadsheet graph shows how long the computers take to load and recalculate a 25-by-25-cell spreadsheet where each cell equals 1,001 times the cell to its left. The spreadsheet program used was Microsoft Multiplan. The tests for the Apple IIe were done with the ProDOS operating system (except for the spreadsheet test, which was done with DOS 3.3). The IBM PC was tested with PC-DOS 2.0.



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If you're an IBM PC user,  
you're a Sourceware user.

## REVIEW: NCR PC

Concluded from P. 234

*The technical manual  
is impressive with  
its detail. The only  
section that could use  
revision is the one  
on installation of  
additional memory.*

from a history of computers to the sort of technical information appreciated by long-time computer users. The technical manual is impressive with its detail. Again, the only area that could use revision is the section that describes installation of additional memory.

Support from the company is also notable. All dealers are trained to provide technical assistance and troubleshoot. The manuals, tutorials, and integrated help package should get you through most crises. The manuals make frequent mention of contacting the local dealer if problems arise.

### CONCLUSION

Although the NCR Personal Computer is not very portable and has the few imperfections I mentioned, it is still a good value. Ease of setup, documentation, tutorials, company backing, and solid engineering make this machine worthwhile. Other features include the choice between two excellent displays, terrific graphics, a RAM-disk utility that runs programs faster than most IBM PC-compatibles, and moderately easy memory expansion.

Having taught computer science to college students, I know the punishment that hardware must withstand. After giving the Model 4 the same type of rough treatment, I can say it is built like a tank. For heavy computer use and business purposes, this durability is a very important consideration. ■

## BYTE U.K.

Concluded from P. 228

*Placing silica gel  
in the chamber  
dries the environment.*

This is accomplished by placing silica gel in the chamber that houses it.

No one knows for certain why it works, but Hollis's theory is that adsorbed moisture on the insulating base of the tube creates variable resistive paths between the high-tension pins (up to 1000 volts). Drying the moisture raises the resistance of such paths.

Hollis is also trying out other types of photodetectors. When I visited, he showed me an experimental setup that uses a photodiode, though so far the results from it have been unsatisfactory.

### CONCLUSION

I was impressed by the simplicity and effectiveness of the system Andrew Hollis developed. Excluding the telescope, the hardware costs less than £600 (about \$760 at the current exchange rate) and yet can produce results with a certainty of  $\pm 0.01$  magnitude, or around 1 percent error. It's also gratifying to see one of the humblest of home microcomputers serving science in such a competent fashion.

Interestingly, Hollis denies that he is in any way a computer buff; he has learned only enough about computers to get the job done, with astronomy always being most important. It's rather sobering to think that the amount of computing he had to learn would probably qualify him as a computer design engineer; we are still living very much in the frontier days.

During my visit to Ormada, a fond hope that I once entertained was revived: that the spread of personal computers might do for computer science what cheaper telescopes have done for astronomy and encourage amateurs to make significant contributions. ■



# JUST COMPUTERS

This is the second issue of JUST COMPUTERS and there are still some who have not yet taken out an annual (or a two or an economical three year) subscription.

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*It just is —*

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By popular acclaim from our readers, in letters received, some of which are published in this issue, many would have JUST COMPUTERS as the highest-quality computer magazine in Australasia. As it is also the biggest, and has the largest circulation, it is recommended as a fine home-bookstand addition for your growing and enquiring family or

A HEAVYWEIGHT BIRTHDAY OR XMAS PRESENT.

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Queensland must subscribe!*

A TEAR-OUT SUBSCRIPTION CARD IS IN THIS ISSUE WITH READER SERVICE CARDS



バイト

## Peripherals, Chips, and New Computers

### Erasable optical-disc coating from Fujitsu and more new Japanese products

BY WILLIAM M. RAIKE

**I**n the past month at least two new personal computers have appeared on the market here; the battle of the memory chips continues with the major contenders evidently undaunted by the slump in the chip market (both Toshiba and Hitachi have introduced new large-scale memory chips); Fujitsu announced a new erasable optical-disc technology; there are glimmers of hope that the dismal situation in the Japanese software industry may be headed for improvement; and I discovered the Silver-Reed EB50, a battery-powered lap-size portable four-color printer/plotter/typewriter/thingamajig that's just plain neat.

#### TAKE YOUR GRAPHICS ALONG

It's hard to know just what to call the Silver-Reed EB50. It looks like a briefcase-size portable electronic typewriter, but there's no print element. Instead there are four ball-point pens (black, red, blue, and green) mounted in a little drum that draws the characters you enter from the keyboard (alphanumeric or katakana) in any of three sizes, in either Courier or italic type, either vertically or horizontally. You can also draw four-color graphs in any of 12 styles, including various kinds of pie charts, bar graphs, and broken-line graphs, complete with labels and axes. A 15-character liquid-crystal display helps you orchestrate all this from the keyboard.

The EB50 has a built-in serial interface, so it only needs paper and an RS-232C cable to turn it into a four-color plotter. A hard carrying case with a handle is standard, and the total weight, including batteries, comes to 5½ pounds. I still don't believe the list price, it's only about \$200. However, I don't have any idea whether the company is planning to export the EB50.

#### NEW FUJITSU OPTICAL-DISC MATERIAL

Optical discs, like videodiscs and compact digital audiodiscs, store large amounts of data; you read the data by scanning the

discs with a laser beam. But you can write data on the newer types of optical discs with a computer, something you cannot do to videodiscs and compact discs. The two main types of optical discs are DRAW (direct read after write), on which you can only write once, and erasable, on which you can write, erase, and rewrite a number of times.

Fujitsu has just developed a new coating material for optical discs that allows data to be written by creating holes in the coating with a laser beam. Then this material can be partially melted by a lower-power laser beam that effectively erases the data. It also overcomes one of the main drawbacks of earlier materials: it is thermally stable, which makes long-term data storage practical. The new material, a thin crystal layer of selenium, indium, and antimony, also resists corrosion and oxidation better than the exotic tellurium used in other optical-recording materials.

To record data, you shine a 5-milliwatt laser beam on the surface for 100 nanoseconds; the surface reflectivity of the resulting hole ends up being about 30 percent higher than the surrounding area. When a half-power laser beam heats up the same spot for several microseconds, the hole is smoothed out, reducing reflectivity by about 20 percent and effectively erasing the data.

Existing optical-disc units store about 1 gigabyte per 20-centimeter disc, but according to BYTE's Japanese sister publication, *Nikkei BYTE*, which featured optical discs in a recent issue, 5¼-inch units are on the way and promise to open up new applications. We should start to see commercial products within the next two years.

#### LET THE CHIPS FALL . . .

Just about all the Japanese electronics giants got into the chip act in recent weeks. First, there was NEC's announcement of a new superfast Josephson-junction inte-

(continued)

William M. Raikes, who has a Ph.D. in applied mathematics from Northwestern University, has taught operations research and computer science in Austin, Texas, and Monterey, California. He holds a patent on a voice scrambler and was formerly an officer of Cryptext Corporation in the United States. In 1980, he went to Japan looking for 64K-bit RAMs. He has been there ever since working as a technical translator and a software developer. He can be contacted c/o BYTE, POB 372, Hancock, NH 03449.



grated circuit (IC). In the U.S., IBM abandoned Josephson-junction research and development as impractical about two years ago; NEC obviously thinks it's not that impractical. Josephson-junction devices use superconductors cooled to -269 degrees Celsius and are capable of the fastest operations currently known. Logic gates based on Josephson-junction technology can operate in times as short as 5 picoseconds, and speed will be a crucial factor in future supercomputer projects. NEC's latest IC, an experimental device, was a multiplier circuit; it could multiply a pair of 4-bit numbers in only 280 picoseconds, several times faster than previously possible. The whole circuit is on a chip only 2.7 millimeters square, and it contains 862 Josephson junctions arranged to form 249 logic gates.

Meanwhile, Toshiba claims to have

developed the fastest 1-megabit dynamic RAM (random-access read/write memory) chip. It has an access time of only 60 nanoseconds. Like many new ultralarge-scale ICs, it's based on CMOS (complementary metal-oxide semiconductor) technology, which means low power consumption; the new 1-megabit memory requires only three-quarters of the power of the 256K-bit dynamic RAM chips being sold now.

Speaking of 256K-bit dynamic RAM chips, I spotted some Hitachi 150-nanosecond memory chips on sale in the electronics bazaar in the Akihabara district of Tokyo just a few days ago. The cost is now down to about \$4.60 per chip; last year the first units were selling for over 10 times that amount.

Recently Hitachi also made a tantalizing announcement: It has developed a "multilevel slant-cell

dynamic RAM." According to the company, with this new technique you can store four times as much information with no change in the dynamic RAM structure; instead of holding 1 bit of data, each cell holds 4 bits (represented by a 16-level staircase-voltage signal). The speed of this new type of memory, 1 to 2 microseconds, is slow compared with conventional dynamic RAM chips, presumably because of some type of analog-to-digital conversion. Nevertheless, it's not hard to think of applications where the speed penalty wouldn't be important. There was no word from Hitachi on when it might be possible to buy a multilevel slant-cell dynamic RAM, or what the cost for such a chip might be.

#### JAPAN MOVES TO IMPROVE SOFTWARE QUALITY

Japanese computer manufacturers and software houses are aware of the low productivity and questionable quality of much software-development activity in Japan; one software company here, Reed Corporation, is dealing with the problem by commissioning over a dozen U.S. software firms to develop custom software, linking minicomputers in Tokyo with the U.S. companies via a satellite hookup.

The Japanese government, through MITI (the Ministry of International Trade and Industry) and its subagency, the Information Technology Promotion Agency (IPA), is concerned about the software problem, which is projected to get worse with time because of the increasing shortage of software specialists. MITI started the Sigma Project this past April in cooperation with domestic and foreign software firms. Combined government and private spending on the project will be almost \$12 million the first year and \$100 million over the next five years; the objective is a fourfold improvement in software productivity and a dramatic improvement in reliability and modularity, particularly in the area of business software.

As hardware costs decrease and computing power increases, software

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# EDITORIAL MATERIAL

for personal computers and low-priced office computers is certain to be a major factor in the success, and even the survival, of computer manufacturers. Part of the dramatic success of the NEC personal computers stems from the company's efforts to encourage and attract independent software houses to develop and sell software products specifically designed for NEC machines. Some other Japanese manufacturers are providing monetary incentives to software developers to encourage them to design and develop software that runs only on their hardware. This could help counter the reluctance of many software firms to invest heavily in the development of general-purpose software for wide distribution; those firms currently rely on orders for high-priced custom software.

## THE NEW IBM 5540 AND THE OKI IF800/60

Last year IBM Japan Ltd. announced its JX personal computer; it was too little too late—basically an IBM PCjr-compatible at IBM PC prices. It was greeted with thundering silence at the cash registers. On the other hand, IBM's 5550 workstation achieved a limited popularity as an office computer, despite its \$4000-plus price tag and extreme sluggishness in recognizing Japanese-language kanji input.

Now IBM has introduced the 5540. In a nutshell, the 5540 is yet another computer based on the 8086 microprocessor, but not much else. Even the kanji ROM (read-only memory) isn't standard; you have to buy it as an option. You get either one or two 5¼-inch 720K-byte floppy-disk drives—not particularly impressive when you consider the 1-megabyte drives in the Fujitsu FM-11BS and FM-16β, or in the newest version of NEC's market-dominating personal computer, the PC-9801M2. (See the May BYTE Japan, page 355, for more information.) Standard memory is 256K bytes, expandable to 640K bytes. The IBM 5540 has no color-display capability; other than that, it can run all the 5550 software, which amounts to a tiny fraction of the soft-

ware available (for example, for NEC's PC-9801 machines). This lackluster bundle costs about \$1450 for the single-drive version and \$1700 for the two-drive version—about the same as for either the Fujitsu or NEC machine, but it has far fewer capabilities and a much narrower choice of software.

The newest machine from Oki Electric, the if800 model 60, is far more likely to win the hearts and minds of the computer-buying public than the IBM 5540. Despite having very little software written specifically for it, the if800/60 comes with Japanese-language MS-DOS 2.11, so owners have access to the mass of generic MS-DOS software on the market. Interestingly, Oki has developed its own windowing software, called SuperView, which runs hand in hand with MS-DOS on the new machine. SuperView also has standard 720- by 512-dot color-graphics capability supported by 512K bytes of graphics video RAM in addition to the 512K bytes of standard main RAM. That's more than double the memory of the NEC PC-9801M2 and better graphics capability than the new Fujitsu FM-16β. Like the NEC machine, the new Oki if800/60 runs an 8-MHz 8086-2 microprocessor; the Fujitsu FM-16β uses the faster 80186 processor and a video coprocessor. All three of these machines include two 1-megabyte 5¼-inch floppy-disk drives; on the Oki you can fit an optional 10-megabyte hard disk into the main unit along with the two floppy disks. The list price for the if800/60 is about \$1750; unlike most other Japanese computers, the Oki's price includes a high-resolution monochrome display, so it actually ends up costing a few hundred dollars less than either the NEC or the Fujitsu machine, and discounts of at least 20 percent are inevitable in this highly competitive market.

## COMING UP

In next month's column I'll report on the first-ever COMDEX in Japan and on several of the products on display there, including a Fujitsu lap-size portable, the NEC PC-8401A, and more. ■

"JUST COMPUTERS" which is Sydney based has just obtained an exclusive licence in New Zealand and Australia to publish editorial material from the prestigious McGraw-Hill, Inc. computer magazines in the U.S.A., viz., "BYTE" and "POPULAR COMPUTING", and printing in New Zealand will be at the same time as production in the U.S.A. We will be including in "JUST COMPUTERS" much of their high-quality editorial which would be of use and interest in Australasia. In this way, we will ensure that the latest developments in the computer industry (which, in the main, occur in the U.S.A.) would appear for the first time in Australasia in "JUST COMPUTERS". "BYTE" is the small systems journal, 9 year old publishing phenomenon in mini and micro computers, an institution, with recent monthly issues ranging over 500 pages; and "POPULAR COMPUTING", the more recent magazine that enables readers to understand the "why", as well as the "how", of small computers so as to guide their purchasing decisions; the news stand sales success story, with readership studies disclosing more than three quarters of a million readers.

A recent reader survey concluded that "BYTE" was distinguished from other computer magazines by the comprehensiveness and depth of its coverage of personal computing. Such material will appear in "JUST COMPUTERS".

□□□□□□□□

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BYTE staff-written highlights of late developments in the microcomputer industry.

## New Multiuser UNIX Systems

Symmetric Computer Systems, San Jose, CA, is selling a 20-pound computer with a 32016 16-/32-bit processor, one parallel port, four serial ports for up to four terminals, a 50-megabyte hard disk, a 1-megabyte floppy disk, and 2 megabytes of RAM. Included in the Model 375's price of \$9950 are compilers or interpreters for C, Pascal, FORTRAN, BASIC, LISP, Prolog, Crystal, and APL. It also includes SPICE, Ingres, and a number of UNIX/GENIX utilities. Although the machine is now available with National Semiconductor's GENIX implementation of Berkeley 4.1 or 4.2 UNIX, Symmetric plans to offer UNIX System V and Berkeley 4.3 versions later this year.

Cadmus Computer Systems, Lowell, MA, announced CadMac, a 68010-based workstation with a 17-inch 1024- by 1024-pixel display, a 65-megabyte hard disk, tape backup, a megabyte of RAM, and a Macintosh-compatible UNIX environment for \$23,300.

Digital Equipment Corp. introduced its expected MicroVAX II, which reportedly outperforms DEC's low-end VAX products. Prices for the MicroVAX II, while much lower than comparable VAX computers, still start at about \$20,000.

## AT&T Offers 32-bit Processor to Other Companies

AT&T announced that its WE32100 32-bit microprocessor, floating-point chips, memory-management chips, and other peripheral chips are now available to other companies. AT&T will also sell board-level evaluation systems based on the chips.

The WE32100 is an enhanced version of the WE32000 chip used in AT&T's 3B2/300 computer; the chip family was originally called Bellmac-32 when developed by AT&T's Bell Labs subsidiary before divestiture. The 132-pin WE32100 chip features a 64-word on-chip cache, a 4-gigabyte address space, 15 interrupt levels, 16 32-bit registers, and a full 32-bit bus. All of the new chips are available in 10- and 14-MHz versions. AT&T's chip is not related to National Semiconductor's 32000-series processors.

## New 80286 Systems Flood COMDEX

Late spring saw the introduction of many new IBM PC AT-compatible computers. By mid-May, new 80286-based systems had been announced by Kaypro, ITT, Compaq, TeleVideo, Corona, Texas Instruments, Zenith, NCR, Tomcat, and Basic Time. Another multiuser AT-compatible computer, available from MAD Computer in both floor and desktop models, will be sold only to other manufacturers. Wang also disclosed that it is developing an AT-compatible system.

Intertec, West Columbia, SC, has redesigned its HeadStart computer, replacing its 8086 processor with an 80286 and eliminating its 3½-inch disk drive. The HeadStart ATS's standard 256K bytes of RAM can be expanded to 3 megabytes; the computer also includes serial, parallel, and network interfaces. The basic HeadStart ATS is priced at \$1895 without disk drives. A dual 5¼-inch disk-drive add-on unit is \$495 extra. Intertec also announced several 80186-based file servers for its MultiLAN proprietary polling network; a \$695 interface card also allows IBM PCs to be attached to the network.

## Network Products Announced

IBM PCs and Macintoshes can communicate using two new networking products. 3Com announced EtherMac, which allows Macintoshes and IBM PCs to link 3Com's 3Server Ethernet network file server to AppleTalk networks. Another product, IBMacBridge from Tangent, is a \$595 expansion card with software linking the IBM PC to the AppleTalk network and Apple's LaserWriter printer.

Separately, Vianetics announced ViaNet, which links MS-DOS- and UNIX-based computers. Rather than requiring a central file server, ViaNet simply treats each node on the network as a separate disk subdirectory, addressable using standard MS-DOS or UNIX path names. ViaNet will be available only to other manufacturers; Tandy, Wang, and several other firms have already licensed the software.



## Add-on Makers Support Expanded-Memory Specification

---

Many of the companies that make expansion cards for the IBM PC have announced memory cards that meet the expanded-memory-interface specification announced by Lotus and Intel in late April. Maynard Electronics, STB, Quadram, Tecmar, Mega-Omega Systems, Emulex/Persyst, and AST Research all announced boards supporting the specification, which uses bank switching to allow application programs to directly address up to 4 megabytes of RAM. Most cards will be available in midsummer. They will be priced from \$349 to \$399 with the first bank of memory installed and can be expanded to 2 megabytes each.

## Mosaic Unveils 1-2-3 Twin

---

Mosaic Software, Cambridge, MA, unveiled a \$145 spreadsheet it says is compatible with Lotus 1-2-3. Mosaic's Twin has a user interface and features similar to those in the Lotus product, but initial versions of the product will not be able to read and write 1-2-3 spreadsheet files. Rather than offering graphics identical to Lotus 1-2-3, Twin's graphics module is derived from earlier products the company developed.

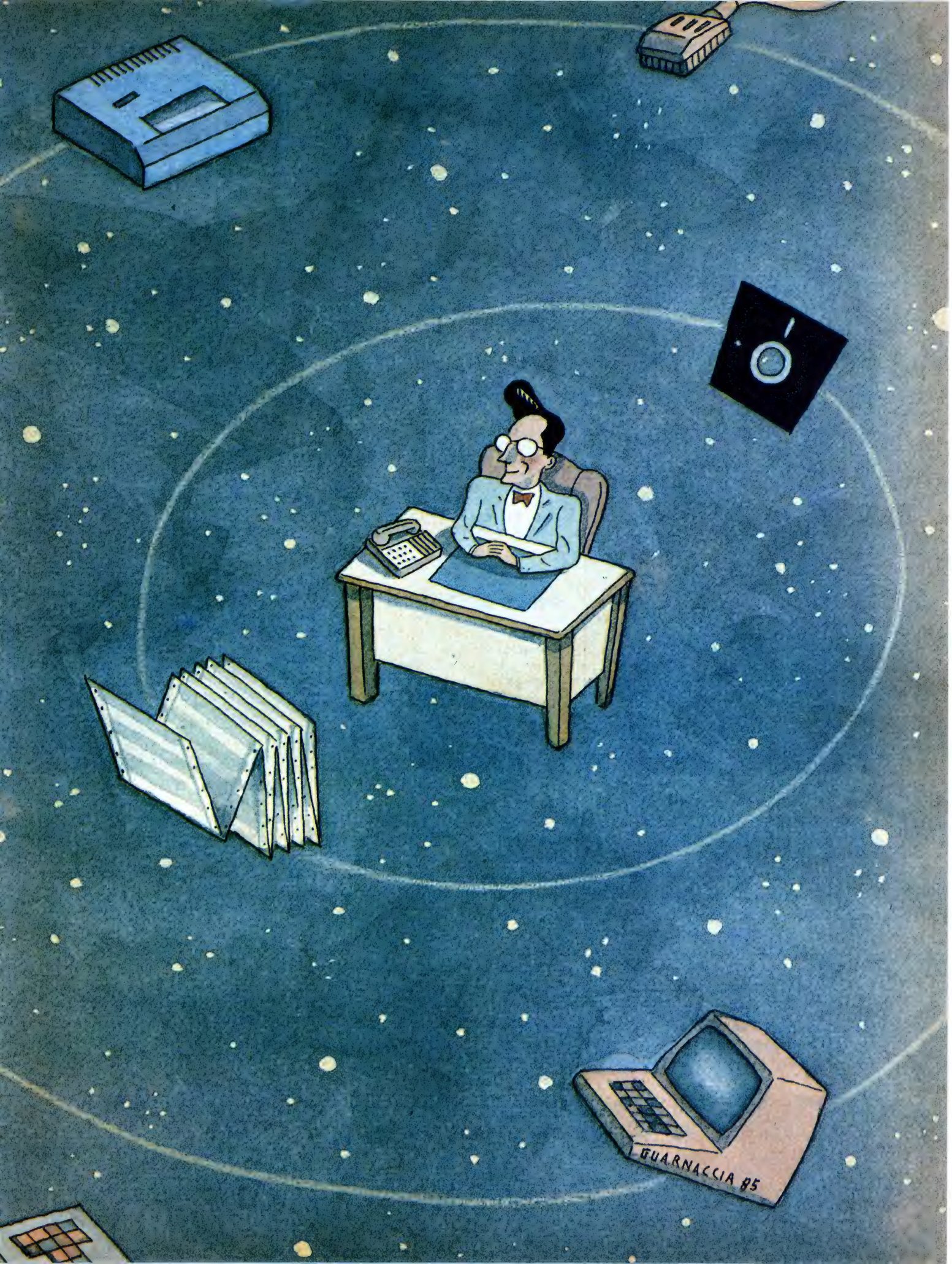
Two other companies—Borland International and Paperback Software—are reportedly developing low-cost spreadsheet programs compatible with 1-2-3, but neither company has formally announced or set availability dates for those products.

## NANOBYTES

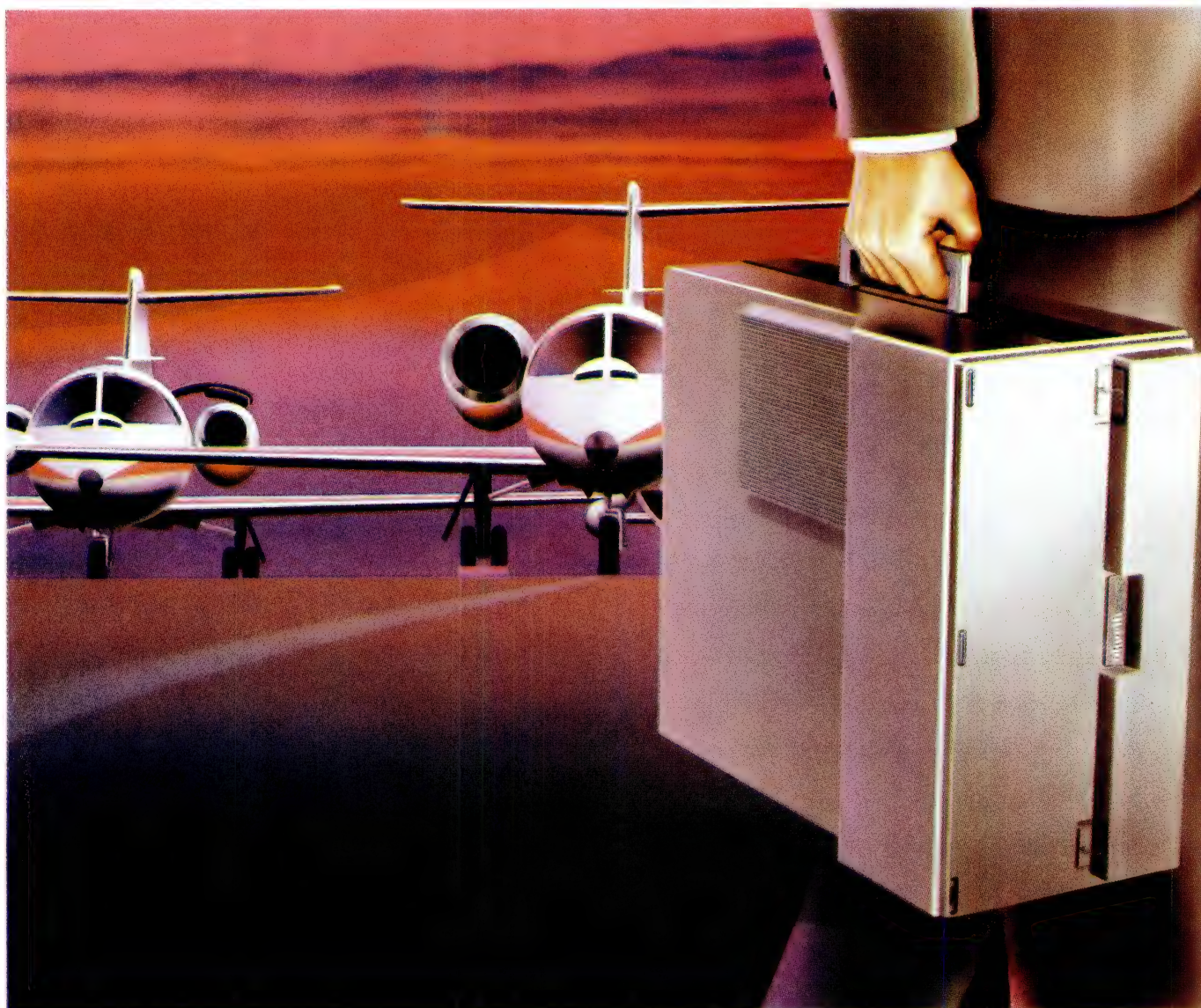
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Congress has repealed a law requiring home computer owners to keep a complete daily log of computer use in order to claim business-use tax deductions. The law still requires some record keeping of computer use to support business-use claims. . . . **Novix Corp.**, Cupertino, CA, has unveiled the NC4000, an 8-MHz 16-bit microprocessor that executes FORTH words as its machine language. . . . **MicroPro** plans to introduce a new word processor in midsummer, priced at less than \$200. The company says the new program will have a user interface unlike those of WordStar and WordStar 2000. . . . **Acuity Computer**, Austin, TX, announced The Shell, a \$100 program that can either replace or enhance the Finder. . . . **Franz Inc.**, Berkeley, CA, planned to begin shipping Franz LISP for AT&T's UNIX PC this month. Franz also expects to provide a complete Common LISP for the UNIX PC by late August. . . . **Prometheus** unveiled a 512K-byte buffer plug-in card for its ProModem, which can be used to buffer incoming and outgoing electronic mail or as a printer buffer; the buffer also provides password and callback security features. The buffer card without memory is \$149 and can use 16K-, 64K-, or 256K-bit chips. . . . **Intel** is now providing samples of 10- and 12-MHz versions of the 80286 processor. . . . **Brother** unveiled the TwinWriter, a \$1300 printer with both daisy-wheel and dot-matrix print elements. . . . **ITT** and **NEC** both introduced new speech-recognition products for the IBM PC and compatible computers. ITT's \$1350 Voice Communications System can recognize up to 200 different words and also features voice playback and phone features. NEC's SAR-10 Voice Plus supports a 250-word vocabulary for \$1495. . . . **Apple** announced in April that it would stop production of the Macintosh XL, originally introduced as the Lisa in January 1983. . . . **Canon** announced the A-200, a \$2995 20-pound IBM-compatible transportable computer with an 80-character by 25-line LCD. Standard features include a built-in 300/1200-bps modem, composite video output, two 5¼-inch disk drives, parallel and serial ports, and 256K bytes of RAM. . . . **Linguistic Products**, The Woodlands, TX, announced two language-translation programs for the IBM PC. English/Spanish and Spanish/English programs are \$490 each or \$790 together. . . . **Kyocera**, which manufactures computer products for several other companies, announced its first retail product: a 1200-bps modem. The \$665 KM1200S will include a copy of Microsoft's Access communications program. Kyocera also announced a 10-page-per-minute, 300-dot-per-inch laser printer that it will sell to other manufacturers. . . . **Personal Touch**, San Jose, CA, announced a touchscreen that can be added to Apple IIs and IBM PCs through a standard joystick port. The Touch Window will cost \$200 for the Apple II and \$225 for the IBM PC when it is shipped later this year. . . . **Datran Corp.**, Los Angeles, CA, announced the Modem Accelerator, a \$795 card that encodes English words into tokens. Files encoded with the IBM PC expansion card are reduced to about one-third the original size. . . . **Micro Focus** has announced a Japanese-language version of its COBOL compiler for the IBM PC 5550 and PC AT. In Japan, the compiler is priced at about \$500. . . . **Edsun Laboratories**, Wayland, MA, offers a signal-converter VLSI chip that converts the Intel 80286's signals to work with less expensive 8088 peripherals. The CMOS EL286-88 allows the 80286 to operate at 8 MHz while interacting with 4.77-MHz IBM PC chips. In quantity, the chip costs \$44.









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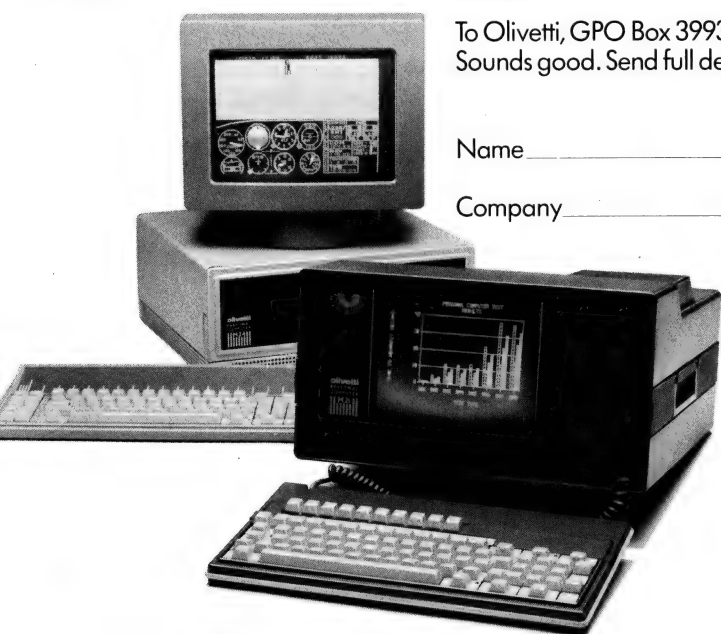
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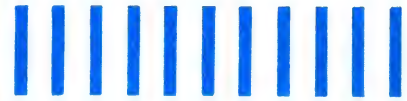


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### STYLING

- The OLIVETTI PERSONAL COMPUTER is an attractive and intelligently designed system, both inside and out. Features include: Solid design, stylish monitor, responsive detachable keyboard.

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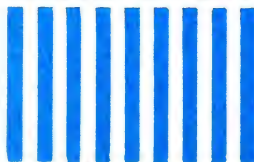
- The graphics capabilities are impressive. All of its graphics modes are faster than those of the IBM, due to the faster overall speed of the OLIVETTI PERSONAL COMPUTER.

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DAISY WHEELS (FOR LQ PRINTERS)
- TYPEWRITERS — RIBBONS — CARBON  
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# WHEN THE CHIPS ARE DOWN

*Beat the high cost and headaches of repair  
by fixing most problems yourself*

BY ROBERT SCAROLA

MANY OF US HAVE OWNED COMPUTERS for a year or more, some of us for nearly a decade. Most of the time, we rhapsodize about them and the capabilities they lend us. But as our equipment grows older, the frequency of problems and need for maintenance and repair also grow.

Metals corrode, cables wear or break, keys stick, soldered connections loosen, chips blow, and downtime becomes inevitable. The standard 90-day warranty expires all too soon, and low-cost, reliable, and fast repair services are still hard to find. Most repair shops charge from \$45 to \$75 per hour, with an hour minimum, just to diagnose a problem. By the time the shop adds parts and labor, the average service charge runs about \$100, with a three-day to three-week turnaround. Nonetheless, manufacturers, dealers, and manuals continue to warn of dire

consequences befalling those who, on their own, try to penetrate the mystery of the motherboard.

With a few simple tools and some basic information, however, computer owners can avoid most of the expense and, even more important, the downtime involved in sending a computer out for repair. In fact, according to some estimates, people with no technical expertise at all can learn to fix 75 percent of their computer problems. Even changing a blown socketed chip is easier than changing a bad spark plug once you're shown how.

## What Can Go Wrong?

Regardless of make, model, or price, all computers are susceptible to certain types of problems. Often a broken wire or loose solder joint causes the monitor to continually flicker or a peripheral to work inter-

PHOTOGRAPH BY ED CRABTREE



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The HR 39 and HR 134 Monochrome Monitors are direct replacements for the IBM Model 5151 Monochrome Display. The HR 39 features a GREEN phosphor screen, while the HR 134 an AMBER screen. Both monitors plug into the IBM Monochrome Display and Printer Adaptor (or compatible) card.

The HR31 200 Colour Monitor is a direct replacement for the IBM Colour Display. It plugs into the IBM Colour/Graphics Adaptor (or compatible) card. The HR31 200 features **0.31mm dot pitch and a black matrix picture tube**. This special tube reduces glare and enhances RGB colour to ensure superb picture quality.

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**Technical Data - HR31 200**  
**CRT Size:** 14" Diagonal (34cm)  
**Tube:** Black Matrix  
**Sync-H. Scan Frequency:** 15.7kHz  
**V. Scan Frequency:** 60Hz  
**Signal Type:** RGB I. TTL Level Positive  
 Sync H/V. TTL Level Positive  
**Display Size (H x V):** 245mm x 170mm  
**Retrace Time (H x V):** 0.5Ms x 0.4msec  
**Resolution:** 640 x 200 lines  
**Input Terminals:** 9 pin "D" type connector  
**Dimensions:** 11"(H) x 15"(W) x 13"(D)  
 266(H) x 367(W) x 318(D)mm  
**Shipping Weight:** 15.9kg



Model HR31 200



Models HR 39 & HR 134

**Technical Data - HR 39 & HR 134**  
**CRT Size:** 12" Diagonal (29cm)  
**Phosphor:** HR 39 (Green); HR 134 (Amber)  
**Sync-H. Scan Frequency:** 18.432kHz  
**V. Scan Frequency:** 50/60Hz  
**Signal Input:** Video - TTL Level Positive  
 Sync. H - TTL Level Positive  
 Sync. V - TTL Level Negative  
**Video Response:** 20MHz  
**Display Size (H x V):** 203mm x 135mm  
**Display Time (H x V):** 44Ms x 18.99msec  
**Resolution:** Centre 1,000 lines  
 Corner 800 lines  
**Display Formats:** 9 x 14 matrix, 2000 characters in  
 80 x 25 format  
**Input Terminals:** 9 pin "D" type connector  
**Dimensions:** 10.5"(H) x 15"(W) x 12"(D)  
 257(H) x 367(W) x 294(D)mm  
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mittently. Corrosion, dirt, or smoke particles build up on the metallic surfaces of cable connectors, pins, or read/write heads, resulting in a variety of problems, ranging from disks that won't boot to complete system malfunction.

Printers and disk drives are often the first source of problems. Because they have many moving parts, they are highly sensitive to dirt or jostling. When a print head or guide bar gets coated with paper dust or grit, the printer jams or misprints. When a disk-drive head loses alignment or needs motor speed adjustment, the drive will not boot or read disks. Hard-disk drives are notorious for crashing—no small wonder when you consider that they rotate at speeds in excess of 3600 rpm, with a read/write head that floats a fraction of a millimeter above the surface of the disk.

But other parts of computer systems are not exempt from breakdown. Sometimes a computer won't function at all, perhaps indicating that a ROM chip or the microprocessor needs cleaning or replacement. Other times, after a program successfully boots, you might see only garbage on the screen, which could indicate a faulty RAM chip. Sometimes, when an I/O chip malfunctions, a peripheral will fail to work.

Besides being damaged by normal wear and tear, chips are also easily damaged by power surges caused by lightning strikes, power company error, or startup of motors on the same circuit as your computer. Similarly, static electricity that you transmit when you touch an open port or even type at the keyboard can easily damage chips as well; your body can carry as much as 30,000 volts of static electricity.

In addition, different models tend to suffer from different types of problems. With Apple II and IIe computers, for example, if peripheral slots are filled with boards and no exterior fan is attached, excess heat can often cause chip failure.

As infuriating as these problems can be, most of them require little or no technical expertise to repair. Apart from aligning and timing disk drives, you can troubleshoot and fix many malfunctions yourself.

Robert Scarola is a computer consultant and writer living in San Anselmo, California.

## Rules for Troubleshooting

**N**O MATTER WHAT THE PROBLEM, these three rules of troubleshooting apply: go from the simple to the complex; substitute working peripherals, cables, or chips to isolate the problem; if you're not sure what you're doing, don't do it!

Suppose, for instance, that you've just started up your word-processing program to finish the last 10 pages of a report. As usual, the disk drive whirs and stops. But instead of seeing the familiar blinking cursor, you face an empty screen. You turn the computer off and try again, but to no avail.

To illustrate the general procedure for troubleshooting, let's walk through the steps involved in tracking down the source of the monitor's problem. The first step seems obvious and requires only common sense: check to make sure that the monitor is plugged in tightly at the AC outlet, the monitor jack is plugged in firmly at both ends, and the contrast and brightness controls are properly adjusted. These oversights, not surprisingly, often turn out to be the culprits.

But barring such a simple solution, the next step demands that you check for slightly more serious causes: a broken cable, a bad solder, or corrosion at the connecting ends of cables. Often, cleaning the metal connectors with a fine-grade sandpaper will clear up the problem at this stage in the process.

If the screen still remains blank, the next step involves the second rule of troubleshooting: substitution. In this case, swap a monitor, then a cable that works properly. If your system works with the substitute, then you've isolated either the faulty monitor or cable, which you may then be able to repair or replace.

If simple substitution does not pinpoint the problem, then you move to the next level of complexity: open the computer, ground yourself (by wearing a static-discharge bracelet, for example) to avoid discharging static electricity into the chips, and locate, clean, and replace the I/O chip—usually seated in a socket—that controls the monitor. To identify the I/O chip, you need to refer to a schematic diagram that labels the placement and function of each chip

on the board. Schematics are sometimes included with operating manuals or can be readily obtained from a dealer or manufacturer.

Once you've found the chip, you can remove it with a small screwdriver or special chip puller and clean its metal pins with fine sandpaper.

Suppose you've cleaned and replaced the I/O chip and the monitor still doesn't work. Adhering to the rule of substitution, you replace the I/O chip with a known good chip. Almost all chips are available from electronic supply houses (see sidebar on page 136), except for manufacturer's ROM chips, which you can buy from some well-stocked dealers. Prices vary from as little as \$2 to \$5 for RAM chips, to \$5 to \$15 for microprocessor chips, to \$15 to \$50 or more for special ROM support, or graphics chips.

If replacing the I/O chip still doesn't solve the problem, you'll have to perform random chip substitution: replace all the socketed chips on the board one by one, and turn the system on between each substitution to see if it works. This diagnostic procedure, which takes from half an hour to an hour, is often the very first thing a repair technician will do. It's fast and easy but can be billed as if it weren't.

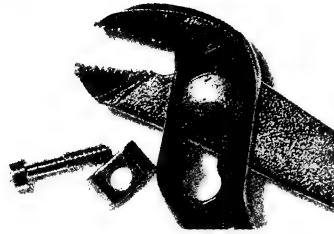
If all these steps don't pinpoint the source of the problem, then the third rule of troubleshooting comes into play: don't do anything else you don't know how to do. Now's the time to call on the professional technician who can desolder soldered chips and employ more sophisticated diagnostic tools. But by that time, you'll often have a fairly clear picture of where the problem lies, be able to save the technician time and save yourself money and downtime, and have a good sense of what you should be charged. You'll also impress the heck out of the technician, who will be more likely to treat you fairly.

## Tools and Know-how

As you can see by tracing the preceding steps involved in troubleshooting an ailing monitor, a little technical information and a few tools go a long way in solving a problem. Requisite tools include small screwdrivers (Phillips head and regular),



## FOR MORE INFORMATION



## BOOKS AND MANUALS

*Don't! (or How to Care for Your Computer)* by Rodnay Zaks,  
Sybex, 1981, \$11.95

*Practical Troubleshooting for Microprocessors* by James W. Coffron,  
Prentice-Hall, 1981, \$22.95

*The Plain English Repair and Maintenance Guide for Home Computers*  
by Henry F. Beechhold, Simon & Schuster, 1984, \$14.95

*Introduction to Microprocessors* by Charles M. Gilmore,  
McGraw-Hill, 1981, \$17.95

*Digital Electronics*, 2nd edition, by William H. Gothmann,  
Prentice-Hall, 1982, \$24.95

*Microcomputer Hardware Handbook* by Ing W. Hofacker,  
Elcomp Publishing, 1982, \$14.95

## SUPPLY CATALOGUES

Jameco Electronic Parts Catalog, 1355 Shoreway Rd., Belmont, CA 94002  
(415) 592-8097; \$1

Mouser Electronics Catalog, 11433 Woodside Ave., Santee, CA 92071  
(619) 449-2222; free

JDR Microdevices, 1224 South Bascom Ave., San Jose, CA 95128  
(408) 995-5430; free

## TECHNICAL EDUCATION PROGRAMMES

National Center for Research in Vocational Education, (800) 848-4815

Vocational Education Curriculum Coordination Centers:

Northeast: New Jersey (201) 390-1191

Southeast: Mississippi (601) 325-2510

East Central: Illinois (217) 786-6375

Midwest: Oklahoma (405) 377-2000

Northwest: Washington (206) 943-9982

Far West: Hawaii (808) 948-7834

## CORRESPONDENCE SCHOOLS

MIT Video Course, Massachusetts Institute of Technology,  
Department 77A, 77 Massachusetts Ave., Room 9-234,  
Cambridge, MA 02139; (617) 253-7444

Cleveland Institute of Electronics, 1776 East 17th St.,  
Cleveland, OH 44114; (216) 781-9400

NRI Schools, McGraw-Hill Continuing Education Center,  
3939 Wisconsin Ave., Washington, D.C. 20016; (202) 244-1600

National Technical Schools, 4000 South Figueroa St., Los Angeles, CA  
90037; (213) 234-9061

## NATIONAL WORKSHOPS

The Cascio School of Computer Technology, Suite B109, 2580 San Ramon  
Valley Blvd., San Ramon, CA 94583; (415) 829-5140; call or write for  
schedule of workshops in your area.

a pair of needle-nose pliers, a pair of wire strippers, a pocket knife, fine sandpaper, a small file, a 25- to 35-watt soldering gun, and 60/40 rosin core solder.

But more important, you need some minimal training in how to check for breaks and loose contacts; correctly solder broken wires and cables; properly clean cable ends, ports, pins, and chips; remove, replace, identify, and order chips; and properly ground yourself before you poke around inside the computer. Reading detailed descriptions of these techniques will often suffice. Better yet, having them demonstrated and practicing them yourself will give you an added measure of confidence and help eliminate mistakes arising from trial and error.

One source of this information is books or manuals on digital electronics and computer operations (see sidebar, at right). These books offer suggestions for environmental control and preventive practices, discussions of applied digital electronics, and a variety of practical tips on computer maintenance.

A second source of information is classes offered by a junior college, business, technical or vocational school, and adult education or regional training program. The education these schools offer, however, is often geared toward a career in the industry and requires a substantial commitment of time, energy, and money. When choosing one of these courses, try to find one that stresses hands-on skills and minimizes electronic theory.

A third source is correspondence schools. With any of these schools, make sure of what you're getting before you sign up. Also, realize that the completion rate for these courses runs about 2 to 3 percent, simply because it takes a lot of self-motivation to learn in isolation.

A fourth and relatively new approach to learning the basics is attending a workshop designed specifically for computer owners interested in maintaining and fixing their own computers. The first organization to offer workshops of this kind is the Cascio School of Computer Technology in San Ramon,



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California. Organized a year ago by a former computer-repair instructor, the school conducts one-day workshops in every major city in the United States.

The \$150 workshop fee includes a tool kit with a set of screwdrivers, pliers, abrasives, a soldering gun and solder, and a troubleshooting manual. Participants get hands-on training in cleaning; soldering; chip removal, replacement, identification, ordering, and substitution; keyboard operation and maintenance; and disassembling and reassembling computers. They also build continuity testers (devices with an LED that clips to each end of a wire, cable, or fuse to test for breaks or loose contacts), as well as a static-discharge device. Finally, workshop participants receive a practical explanation of circuit-board organization and function.

The skills participants learn go beyond just conquering fears. One participant, for example, used his newfound knowledge to replace a blown chip on one of his Apple disk-drive controller cards. Previously, he reported, such a repair would have meant traveling 40 miles to an Apple dealer, plus a \$50 to \$75 repair bill and at least three days of downtime.

### A Fix in Time

Of course, once you acquire the skills and tools, you might still prefer to send your computer out for repair, especially if you have money to burn or you're one of those lucky individuals who has discovered a reputable, reliable, and fast repair shop. But performing your own simple, semitechnical repairs can cut down your trips to the shop and catch problems before extensive damage is done.

Similarly, by capitalizing on your skills, you needn't trade in an older model or donate it to a charitable organization for a tax write-off just because a snazzier one appears on the market. It often makes more sense to maintain your machine and progressively upgrade it as your needs demand. With proper maintenance and minor repair, a computer will last for many years and continue to do the job it was built to do. □



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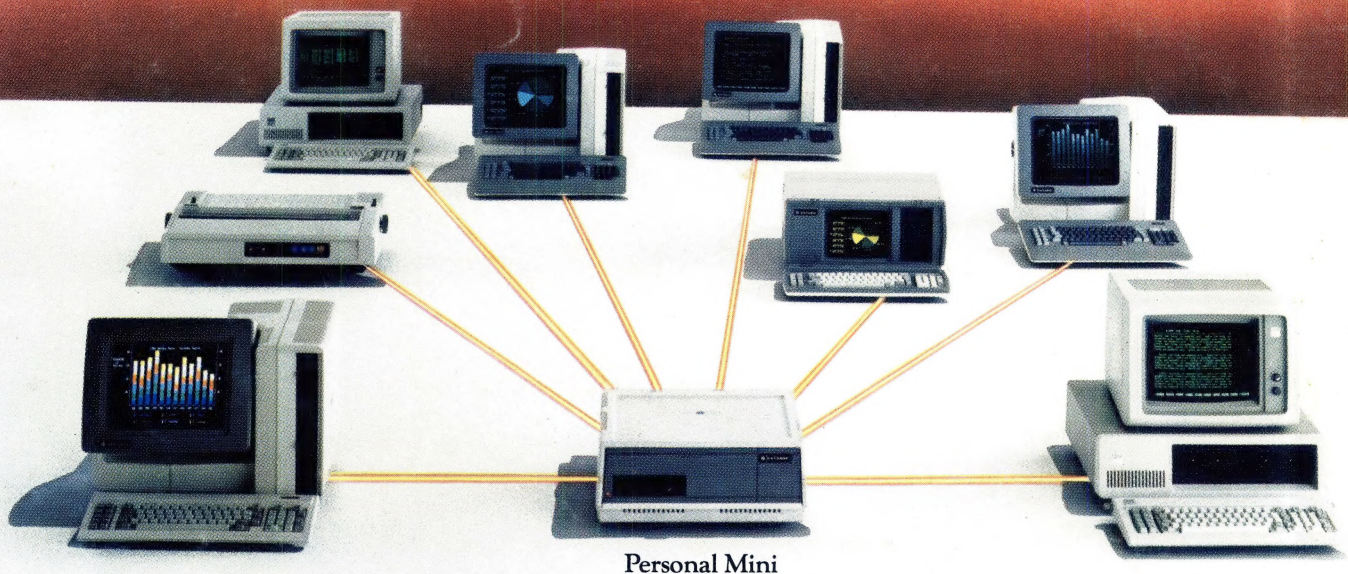
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